

## **Proposal for amendments to ECE/TRANS/WP.29/GRPE/2018/3 on Proposal for a new series of amendments (05) to Regulation No. 96 (Diesel emission (agricultural tractors))**

The text reproduced below was prepared by the expert from the European Commission. Modifications to ECE/TRANS/WP.29/GRPE/2018/3 are marked in **bold**.

### **I. Proposal**

*Add new paragraph to Scope:*

- 1.2. This Regulation shall not apply to monitoring of emissions of pollutants from engines operated in category T vehicles or non-road mobile machinery over their normal patterns, conditions and payloads "**

*Paragraph 2.1.11., amend to read:*

- 2.1.11. "Constant-speed engine" means an engine **the** type-approval of which is limited to constant-speed operation, excluding engines the constant-speed governor function of which is removed or disabled; it may be provided with an idle speed that can be used during start-up or shut-down and it may be equipped with a governor that can be set to an alternative speed when the engine is stopped;‡

*Paragraph 2.1.30., amend to read:*

- 2.1.30. "Engine type" means a group of engines which do not differ in such essential engine characteristics **as defined in Annex 10 to this Regulation;**

*Paragraph 4.3.8.(a), amend to read:*

- (a) The trademark or trade name of the manufacturer of the engine **and the address at which it can be contacted;**

*Paragraph 5.5., amend to read:*

- 5.5. Engine types and engine families shall be designed and fitted with emission control strategies in such a way as to prevent tampering to the extent possible. **For this purpose, paragraphs 3 and 4 of Annex 9 and Appendix A.3 of Annex 9 shall apply.**

*Paragraph 12.4., amend to read:*

- 12.4 Contracting Parties applying this Regulation may continue to grant approvals to those engines which comply with any previous sets of requirements, or to any level of this Regulation provided that the engines or the vehicles are intended for export to countries that apply the relating requirements in their national legislations. **Markings for these engines shall maintain the format defined in the relevant series of amendments to this Regulation.**

*Paragraph 12.6., is deleted:*

~~12.6 As from the dates set out in paragraph 12.3 of this Regulation, and by way of derogation to the obligations of Contracting Parties, the Contracting Parties applying this Regulation and also applying in their national/regional territory monitoring of in-service engines, may no longer accept type approvals granted on the basis of this Regulation as an alternative to compliance with their national/regional legislation, unless the requirements for monitoring of in-service engines are fulfilled as prescribed in the national/regional legislation.~~

*Title of Appendix 1 to paragraph 5, amend to read:*

**Stage V exhausts** emission limits

*Paragraph 1.9. of Annex 1, amend to read:*

1.9. Manufacturer's declaration and supporting data demonstrating that the emission control strategies fitted are designed in such a way as to prevent tampering to the extent possible, as referred to in paragraph 5.5 and Appendix 3 to Annex 9 of this Regulation.

*Paragraph 2.3.3. of Annex 1, amend to read:*

2.3.3. **Number of characters.**

**The number of characters shall not exceed the following:**

- (a) 15 for the engine family designation;
- (b) 25 for the engine type designation;
- (c) 40 for the FT.

*Paragraph 2.3.4. of Annex 1, amend to read:*

2.3.4. **Characters allowed.**

**The engine** type designation and engine family designation shall be made up of Roman letters and/or Arabic numerals;

*Paragraph 2.3.4.2.1. of Annex 1, amend to read:*

2.3.4.2.1. The reasons for using such variable characters shall be explained to the technical service and **Type Approval Authority**.

*Paragraph 2. of Annex 1-Appendix A.3, amend to read:*

2. COMMON DESIGN PARAMETERS OF ENGINE FAMILY<sup>(1)</sup>

*Annex 2, amend "Addendum" to read:*

#### ADDENDUM

*Add new paragraphs 11.3., 11.3.1. and 11.3.2. of Annex 2 Addendum Part B:*

**11.3. Reference values in case the contracting party requires to conduct in-service monitoring tests**

**11.3.1. NRTC reference work (kWh):**

**11.3.2. NRTC reference CO<sub>2</sub> (g):**

*Amend paragraph 10.3.1. of paragraph A.1.3. of Annex 2 – Appendix A.1 to read:*

10.3.1 Hot cycle CO<sub>2</sub> (g/kWh):

*Add new paragraphs 11.3., 11.3.1. and 11.3.2. of paragraph A.1.3. of Annex 2 – Appendix A.1:*

**11.3. Reference values in case the contracting party requires to conduct in-service monitoring tests**

**11.3.1. NRTC reference work (kWh)<sup>(5)</sup>:**

**11.3.2. NRTC reference CO<sub>2</sub> (g)<sup>(6)</sup>:**

*Add new footnotes <sup>(5)</sup> and <sup>(6)</sup> of paragraph A.1.3. of Annex 2 – Appendix A.1:*

<sup>(5)</sup> **Where engine is tested on NRTC record value from 10.3.3., otherwise leave blank**

<sup>(6)</sup> **Where engine is tested on NRTC record value from 10.3.4., otherwise leave blank**

*Paragraph 5.2.5.2. of Annex 4, amend to read:*

5.2.5.2. Rated speed

The rated speed is defined in paragraph 2.1.72. Rated speed for variable speed engines subject to an emission test **other than those tested on a constant-speed NRSC defined in paragraph 2.1.12.** shall be determined from the applicable mapping procedure set out in paragraph 7.6.. **Rated speed for variable-speed engines tested on a constant-speed NRSC shall be declared by the manufacturer according to the characteristics of the engine.** Rated speed for constant speed engines shall be declared by the manufacturer according to the characteristics of the governor. Where an engine type equipped with alternative speeds as permitted by paragraph 2.1.11 of this Regulation is subject to an emission test, each alternative speed shall be declared and tested.

If the rated speed determined from the mapping procedure in paragraph 7.6. is within ± 150 rpm of the value declared by the manufacturer for engines of category NRS provided with governor, or within ± 350 rpm or ± 4 per cent for engines of category NRS without governor, whichever is smaller, or within ± 100 rpm for all other engine categories, the declared value may be used. If the tolerance is exceeded, the rated speed determined from the mapping procedure shall be used.

For engines of category NRSh the 100 % test speed shall be within ± 350 rpm of the rated speed **declared by the manufacturer.**

Optionally, MTS may be used instead of rated speed for any steady state test cycle.

*Paragraph 5.2.5.3. of Annex 4, amend to read:*

5.2.5.3. Maximum torque speed for variable speed engines

**Where required, the maximum torque speed determined from the maximum torque curve established from the applicable engine mapping procedure in paragraph 7.6.1 or 7.6.2. shall be one of the following:**

- (a) The speed at which the highest torque was recorded; or,
- (b) The average of the lowest and highest speeds at which the torque is equal to 98 per cent of the maximum torque. Where necessary, linear

interpolation shall be used to determine the speeds at which the torque is equal to 98 per cent of the maximum torque.

If the maximum torque speed determined from the maximum torque curve is within  $\pm 4$  per cent of the maximum torque speed declared by the manufacturer for engines of category NRS ~~or NRSb~~, or  $\pm 2,5$  per cent of the maximum torque speed declared by the manufacturer for all other engine categories, the declared value may be used for the purpose of this regulation. If the tolerance is exceeded, the maximum torque speed determined from the maximum torque curve shall be used.

*Paragraph 8.1.9.1.4.(b) of Annex 4, amend to read:*

- (b) A humidified test gas shall be created by bubbling zero air that meets the specifications in paragraph 9.5.1 **of this Annex** through distilled water in a sealed vessel. If the sample is not passed through a dryer, control the vessel temperature to generate an **H<sub>2</sub>O content in the test gas** at least as high as the maximum expected during testing. If the sample is passed through a dryer during testing, control the vessel temperature to generate an **H<sub>2</sub>O content in the test gas** at least as high as **the maximum expected at the outlet of the dryer, according to the requirements** in paragraph **9.3.2.3.1.1. of this Annex**;

*Paragraph 8.1.9.2.4.(b) of Annex 4, amend to read:*

- (b) A humidified CO<sub>2</sub> test gas shall be created by bubbling a CO<sub>2</sub> span gas through distilled water in a sealed vessel. If the sample is not passed through a dryer, control the vessel temperature to generate an **H<sub>2</sub>O content in the test gas** at least as high as the maximum expected during testing. If the sample is passed through a dryer during testing, control the vessel temperature to generate an **H<sub>2</sub>O content in the test gas** at least as high as **the maximum expected at the outlet of the dryer, according to the requirements** in paragraph 9.3.2.3.1.1. of this Annex. A CO<sub>2</sub> span gas concentration shall be used at least as high as the maximum expected during testing;

*Paragraph 8.1.11.1.5.(e) of Annex 4, amend to read:*

- (e) The NO span gas shall be humidified by bubbling it through distilled water in a sealed vessel. If the humidified NO span gas sample does not pass through a sample dryer for this verification test, the vessel temperature shall be controlled to generate an **H<sub>2</sub>O content in the span gas** approximately equal to the maximum mole fraction of H<sub>2</sub>O expected during emission testing. If the humidified NO span gas sample does not pass through a sample dryer, the quench verification calculations in paragraph 8.1.11.2.3. of this Annex scale the measured H<sub>2</sub>O quench to the highest mole fraction of H<sub>2</sub>O expected during emission testing. If the humidified NO span gas sample passes through a dryer for this verification test, the vessel temperature shall be controlled to generate an **H<sub>2</sub>O content in the span gas** at least as high as **the maximum expected at the outlet of the dryer, according to the requirements** set out in paragraph 9.3.2.3.1.1. of this Annex. For this case, the quench verification calculations set out in paragraph 8.1.11.2.3. of this Annex do not scale the measured H<sub>2</sub>O quench;

*Paragraph A.1.2.1.1.1. of Annex 4-Appendix A.1, amend to read:*

A.1.2.1.1.1. The particle sampling system shall consist of a probe or sampling point extracting a sample from a homogeneously mixed flow in a dilution system as described in paragraph 9.2.2. or 9.2.3. of this Annex, a volatile particle remover (VPR) upstream of a particle number counter (PNC) and suitable transfer **line**.

*Paragraph A.1.2.1.2.1. of Annex 4-Appendix A.1 (second sub-paragraph), amend to read:*

The sampling probe tip or particle sampling point and particle transfer **line** (PTL) together comprise the particle transfer system (PTS). The PTS conducts the sample from the dilution tunnel to the entrance of the VPR. The PTS shall meet the following conditions:

*Paragraph A.1.2.1.2.1.(b) of Annex 4-Appendix A.1, amend to read:*

(b) In the case of partial flow dilution systems of the total sampling type (as described in paragraph 9.2.3. of this Annex) the particle sampling point or sampling probe shall be located in the particulate transfer **line**, upstream of the particulate filter holder, flow measurement device and any sample/bypass bifurcation point. The sampling point or sampling probe shall be positioned so that the sample is taken from a homogeneous diluent/exhaust mixture. The dimensions of the particle sampling probe should be sized not to interfere with the operation of the partial flow dilution system.

*Paragraph A.1.2.1.4.1. of Annex 4-Appendix A.1, amend to read:*

A.1.2.1.4.1. The particle sampling system shall consist of a sampling probe tip or particle sampling point in the dilution system, a particle transfer **line** (PTL), a particle preclassifier (PCF) and a volatile particle remover (VPR) upstream of the particle number concentration measurement (PNC) unit. The VPR shall include devices for sample dilution (particle number diluters: PND1 and PND2) and particle evaporation (Evaporation tube, ET). The sampling probe or sampling point for the test gas flow shall be so arranged within the dilution tract that a representative sample gas flow is taken from a homogeneous diluent/exhaust mixture. The sum of the residence time of the system plus the response time of the PNC shall be no greater than 20 s.

*Paragraph A.1.2.1.4.2. of Annex 4-Appendix A.1 (first sub-paragraph), amend to read:*

The sampling probe tip or particle sampling point and particle transfer **line** (PTL) together comprise the particle transfer system (PTS). The PTS conducts the sample from the dilution tunnel to the entrance to the first particle number diluter. The PTS shall meet the following conditions:

*Paragraph A.1.2.1.4.2. of Annex 4-Appendix A.1 (third sub-paragraph), amend to read:*

In the case of partial flow dilution systems of the total sampling type (as described in paragraph 9.2.3. of this Annex) the particle sampling point shall be located in the particulate transfer **line**, upstream of the particulate filter holder, flow measurement device and any sample/bypass bifurcation point. The sampling point or sampling probe shall be positioned so that the sample is taken from a homogeneous diluent/exhaust mixture.

*Paragraph 2.4.15. of Annex 10 (second sub-paragraph), amend to read:*

In addition to belonging to the same dual-fuel type, they shall have a maximum gas energy ratio on the applicable test cycle ( $GER_{cycle}$ ) within the range 70 to 100 per cent of that of the engine type with the highest  $GER_{cycle}$ .

*Add new paragraph 2.4.16. of Annex 10:*

**2.4.16. Reserved**

## **II. Justification**

This document corrects the provision allowing contracting parties to require in-service monitoring of engines by explicitly excluding its application from the scope of the Regulation.

It also addressed editorial changes and missing provisions.

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