

**Revised proposal for an amendment to Regulation No. 85  
in view of type-approving Heavy-Duty dual-fuel vehicles**

**Submitted by the chair of the informal GFV group**

This document is a revised version of informal document **GRPE-62-17**

## I. Proposal

*Paragraph 2, add new definitions to read:*

2.8 "Dual-fuel engine" means an engine system type approved according to Regulation No. 49 or mounted on a vehicle type approved with regards to its emissions according to Regulation No. 49 and that is designed to simultaneously operate with diesel fuel and a gaseous fuel, both fuels being metered separately, where the consumed amount of one of the fuels relative to the other one may vary depending on the operation;

2.9 "Dual-fuel vehicle" means a vehicle that is powered by a dual-fuel engine and that supplies the fuels used by the engine from separate on-board storage systems;

2.10 "Dual-fuel mode" means the normal operating mode of a dual-fuel engine during which the engine simultaneously uses diesel fuel and a gaseous fuel at some engine operating conditions;

"2.11 "Diesel mode" means the normal operating mode of a dual-fuel engine during which the engine does not use any gaseous fuel for any engine operating condition;

*Paragraph 5.2.1., amend to read:*

5.2.1. The net power test shall consist of a run at full throttle for positive ignition engines and at full-load for compression ignition engines and dual-fuel engines, the engine being equipped as specified in Table 1 of Annex 5 to this Regulation.

5.2.1.1 In case of a dual-fuel engine that has a diesel mode, the test shall consist of a run on the dual-fuel mode and of a run on the diesel mode of that same engine

*Paragraph 5.2.3.2., amend to read:*

5.2.3.2. For positive ignition engines and dual-fuel engines fuelled with LPG:

*Paragraph 5.2.3.3., amend to read:*

5.2.3.2. For positive ignition engines and dual-fuel engines fuelled with natural gas:

*Paragraph 5.2.3.4., amend to read:*

5.2.3.4. For compression ignition engines and dual-fuel engines:

*Paragraph 5.2.3.3.5. (former) renumber as 5.2.3.3.6.*

Paragraph 5.2.3.3.4. (former) renumber as 5.2.3.3.5.

Insert a new paragraph 5.2.3.3.4. to read

5.2.3.3.4. In the case of an engine labelled for one specific LNG fuel composition:

The fuel used shall be the fuel for which the engine is labelled or the reference fuel G<sub>20</sub> specified in Annex 8 if the engine is labelled LNG<sub>20</sub>.

Insert a new paragraph 5.2.3.6. to read

5.2.3.6. Dual-fuel engines or vehicles that have a diesel mode are to be tested with the fuels appropriate to each mode, in accordance with the provisions set in Paragraphs 5.2.3.1 to 5.2.3.5.

Paragraph 5.4, amend to read:

5.4. Interpretation of Results

The net power and the maximum 30 minutes power for electric drive trains indicated by the manufacturer for the type of drive train shall be accepted if it does not differ by more than  $\pm 2\%$  for maximum power and more than  $\pm 4\%$  at the other measurement points on the curve with a tolerance of  $\pm 2\%$  for engine or motor speed, or within the engine or motor speed range (X1 min-1 + 2%) to (X2 min-1 -2%) (X1 < X2) from the values measured by the technical service on the drive train submitted for testing.

In case of a dual-fuel engine, the net power indicated by the manufacturer shall be the one measured on the dual-fuel mode of that engine

Annex 1, insert a new paragraph 1.3. to read

1.3. Dual-fuel vehicle: YES/NO <sup>(1)</sup>

Annex 1, insert a new paragraph 1.3.1. to read

1.3.1. Dual-fuel engine having a diesel mode: YES/NO <sup>(1)</sup>

Annex 1 Paragraph 30, amend to read:

3.0. Fuel: diesel oil/petrol/LPG/CNG/LNG <sup>(1)</sup>

Annex 1, insert a new paragraph 3.0.1. to read

3.0.1. When applicable, the additional character(s) in the approval marking required by Regulation No. 49, the purpose of which is to distinguish the type of engine for which the approval has been granted (e.g. HL<sub>r</sub>)

Annex 1, insert a new paragraph 3.4. to read

3.4. Gas and dual-fuel engines

3.4.1. Self-adaptive fuelling: YES/NO <sup>(1)</sup>

3.4.2. In case of an engine without self-adaptive fuelling: specific gas composition / range of gases for which the engine is calibrated

*Annex 1 Paragraph 17.0, amend to read:*

- 17.0. ADDITIONAL INFORMATION ON TEST CONDITIONS (for positive ignition and dual-fuel engines only)

*Annex 1, insert a new paragraph 17.5. to read*

17.5. Gas fuel used for the test: Reference fuel <sup>(2)</sup> / other <sup>(1)</sup>

17.5.1. If the gas fuel used for the test is a reference fuel, label of that gas:

17.5.2. If the gas fuel used for the test is not a reference fuel, composition of that gas: )

*Annex 1, insert a new foot-note <sup>(2)</sup> after paragraph 17.5. to read*

<sup>(2)</sup> As specified in Annex 8 of this Regulation

*Annex 3a Paragraph 11.2. add a new line at the end of the paragraph to read:*

Dual-fuel engine: YES with a diesel mode / YES without a diesel mode / NO <sup>(1)</sup>

*Annex 3a Paragraph 11.3. amend to read:*

- 11.3. Engine fuel requirements: leaded petrol / unleaded petrol / diesel fuel / CNG / LNG / LPG: <sup>(1)</sup>

*Annex 3b Paragraph 13.2. add a new line at the end of the paragraph to read:*

Dual-fuel engine: YES with a diesel mode / YES without a diesel mode / NO <sup>(1)</sup>

*Annex 3b Paragraph 13.3. amend to read:*

- 13.3. Engine fuel requirements: leaded petrol / unleaded petrol / diesel fuel / CNG / LNG / LPG: <sup>(1)</sup>

*Annex 5 – Appendix - Paragraph 2.2. amend to read:*

- 2.2. For positive-ignition and dual-fuel engines operating on gaseous fuel

*Annex 5 – Appendix - Paragraph 2.4. amend to read:*

- 2.4. For compression-ignition and dual-fuel engines operating on diesel fuel

## II. Justification

The principles for amending R85 in view of permitting the type approval of dual-fuel Heavy Duty engines and vehicles were presented to GRPE in its 62<sup>nd</sup> session in June 2011 (Informal document **GRPE-62-17**)

The comments from the Polish delegation were taken into consideration and the definitions aligned with those proposed in the GFV proposal to amend Regulation R49.

Further, the Annexes to R85 regarding the documentation provided to the type approval authority have been amended to include the information specific to dual-fuel engines and vehicles.

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