

Proposal for an amendment to Regulation No. 85

Submitted by the informal GFV group

I. Proposal

Paragraph 2, add definitions to read:

2.8 "Dual-Fuel engine"

Text to be further discussed when discussing the main HDDF topics for R49 [means an engine that uses simultaneously 2 different types of fuels supplied from separate storage systems and where the consumed amount of one of the fuels versus the other one may vary depending on the operation.]

2.9 "Dual-Fuel vehicle"

Text to be further discussed when discussing the main HDDF topics for R49 [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"

Text to be further discussed when discussing the main HDDF topics for R49 [means the operating mode of a dual-fuel engine where the engine uses simultaneously 2 different types of fuels]

2.10.1 "Diesel mode"

Text to be further discussed when discussing the main HDDF topics for R49 [means, when applicable, the operating mode of a dual-fuel engine where the engine uses exclusively Diesel fuel]

2.10.2 "Gas Ratio"

Text to be further discussed when discussing the main HDDF topics for R49 [means the ratio of the energy content of the gas fuel over the energy content of the total fuel (Diesel+gas).]

2.10.3 "Heavy-Duty Dual-Fuel (HDDF) Type 1A engine or vehicle"

Text to be further discussed when discussing the main HDDF topics for R49 [means a Diesel-gas Dual-fuel engine or vehicle operating with an average Gas Ratio that is not lower than 90% (GR \geq 90%)¹.]

2.10.4 "HDDF Type 1B engine"

¹ An engine that can operate or idle solely on diesel fuel does not meet this definition. It would then be an HDDF Type 2A or HDDF Type 2B as appropriate

Text to be further discussed when discussing the main HDDF topics for R49 [means a Diesel-gas Dual-fuel engine or vehicle operating with an average Gas Ratio that is not lower than 90% (GR \geq 90%)^[1] where the engine also has been type approved to operate as a Diesel fuel engine according to this Regulation.]

2.10.5 "HDDF Type 2A engine"

Text to be further discussed when discussing the main HDDF topics for R49 [means a Diesel-gas Dual-fuel engine or vehicle that typically is operating with a Gas ratio varying between 10% and 90% (90% > Gas Ratio > 10%).]

2.10.6 "HDDF Type 2B engine"

Text to be further discussed when discussing the main HDDF topics for R49 [means a Diesel-gas Dual-fuel engine or vehicle that typically is operating with a Gas ratio varying between 10% and 90% (90% > Gas Ratio > 10%) where the engine also has been type approved to operate as a Diesel fuel engine according to this Regulation.]

2.10.7 "HDDF Type 3 engine"

Text to be further discussed when discussing the main HDDF topics for R49 [means a Diesel-gas Dual-fuel engine or vehicle operating with an average Gas Ratio that does not exceed 10% (GR \leq 10%).]

Paragraph 5.2.1., amend to read:

- 5.2.1. The net power test shall consist of a run **at full-load, the engine being equipped as specified in Table 1 of Annex 5 to this Regulation.**
- 5.2.1.1 **In case of a HDDF Type 1B, HDDF Type2B, or HDDF Type 3, 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 HDDF engines** fuelled with LPG:

Paragraph 5.2.3.3., amend to read:

5.2.3.2. For positive ignition engines **and HDDF engines** fuelled with natural gas:

Paragraph 5.2.3.4., amend to read:

5.2.3.4. For compression ignition engines **and HDDF engines**:

Paragraph 5.2.3.3.5. to be renumbered 5.2.3.3.6.

Paragraph 5.2.3.3.4. to be renumbered 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. In case of dispute the fuel used shall be the reference fuel G_{20} specified in Annex 8 if the engine is labelled LNG_{20} , or the reference fuel G_R if the engine is labelled LNG_R**

Insert a new paragraph 5.2.3.6. to read

- 5.2.3.6. **Dual fuel engines or vehicles that are certified to run either on a dual fuel or on a Diesel mode (HDDF Type 1B, HDDF Type 2B, and HDDF Type 3) are to be tested with both fuels, in accordance with the provisions set in Paragraphs 5.2.3.**

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 ($X1 \text{ min-1} + 2\%$) to ($X2 \text{ min-1} - 2\%$) ($X1 < X2$) from the values measured by the technical service on the drive train submitted for testing.

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

II. Justification

The purpose of these amendments is to extend the scope of Regulation No. 85 to Heavy-Duty Dual Fuel (Diesel-gas) engines.

In addition paragraph 5.2.1. was amended in order to keep it at the state-of-the-art level.
