

Status of the HDDDF retrofit regulation

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Geneva

Overview

A new regulation is developed which includes the requirements for the type approval of **retrofit systems** intended to be fitted on a heavy duty diesel vehicle to enable its operation either in diesel mode or in dual-fuel mode.

Only Euro V and EEV vehicles were included.

Issues to be considered

- Regulation for type approval of **systems** for retrofitting diesel vehicles to dual fuel operation, but it references to R49: type approval of **engines**
- Tension between retrofit conversion effort/costs and environmental impact/benefit
- Level playing field for both retrofit system manufacturers and engine/vehicle manufacturers
- Euro IV, V and EEV diesel engines have limited diagnostic functionality and no NO_x closed loop control (difference with R115 for LDV's)

Progress since Jan 2016 GRPE

- Concerns raised by the German delegation and the legal department of DG-GROWTH of the European Commission were discussed and solved
- Draft regulation was finalised
- Discussions about CO/NMHC derogations
- 5 tele/web TF meetings
- 1 face to face meeting (2 days)
- Working document submitted to GRPE

Changes since Jan 2016 GRPE

- Concerns from the German delegation and from the legal department of DG-GROWTH of the European Commission;
 - Removed possibility to perform retrofit system type approval on a non compliant demonstration engine (even when the retrofitted engine would be compliant on DF operation)
 - Removed simplified engine test bench (ESC only) and chassis dyno tests and provisions for increased CO emissions
 - Improvements in other parts of the document

Changes since Jan 2016 GRPE

- Retrofit system parts information system introduced for the retrofit system plate
- Administrative provisions were finalised
- Installation- and user manual requirements were finalised
- Fuel related requirements were introduced
 - reference fuels vs market fuels
 - composed representative fuels (if market fuel cannot be acquired)
 - universal fuel approval vs fuel range restricted approval

HDDF retrofit regulation

Structure:

I - Preamble and guidance

II - Requirements and specifications

- Annex 1 - Information ~~and Communication~~ documents

- Appendix 1 - Essential characteristics of the (parent) retrofit system and of the demonstration engine

- Appendix 2 - Essential characteristics of the engine retrofit system family and of the application range

- Annex 2 - (Reserved)

- Annex 3 - Information document regarding the actual applications

- Appendix 1 - List of actual applications

HDDF retrofit regulation

- Annex 4 - Arrangement of the dual-fuel engine retrofit system type approval mark
- Annex 5 - Communication concerning the approval or extension or refusal or withdrawal of approval or production definitively discontinued of a type of an engine retrofit system (HDDF-ERS) pursuant to Regulation No. XXX
- Annex 26 - Dual-fuel engine retrofit systems intended to be fitted on road vehicles – Requirements and tests

Emission tests

Type-approval extension

For a type approval extension, the emissions may be measured with a (retrofit specific) test procedure using a Portable Emission Measurement System mounted on a vehicle equipped with the retrofit system.

Back-to-back comparison between a test in diesel mode and a test in dual-fuel mode (measurement of BSFC emissions is not feasible)

Measurement **in accordance with the type approval test procedure (against the emission limits on an engine test bench)**, ~~on a chassis dynamometer~~ or **back-to-back** on the road at the choice of the manufacturer.

Emission tests

Type-approval extension

- The working principle has always been that the pollutant emissions of a retrofitted dual-fuel engine shall be lower than or equal to those of the original diesel engine
- A derogation for CH₄ emissions is already implemented (GHG neutral)
- Diesel engines may show NMHC and/or CO emissions far below the emission limits
- System manufacturers raised concerns not to be able to meet those emission levels in dual-fuel mode
- Manufacturers desire derogations for CO and NMHC emissions

Vehicle certification / Vehicle approval after the retrofit conversion

The (re-)certification of a retrofitted vehicle including all the quality requirements should be handled in national and/or CP legislation

- The check that the Vehicle Retrofit System is approved for the engine/vehicle combination and is installed in line with the installation manual
- Safety check of the conversion in line with R67 and R110 (including check of the used components)
- Specific attention for the installation of the cylinders and the safety devices.

Retrofit Heavy Duty Dual Fuel

Thank You