



Informal Group on Gaseous Fuelled Vehicles (GFV)

Status report 71st GRPE June 2015



Meetings GFV Group

- 38th GFV meeting
 - **25 and 26 February 2015 RDW/Brussels**
- 39th GFV meeting
 - **25 and 26 March 2015 EC/Brussels**
- 40th GFV meeting
 - **11 May 2015 RDW/Zoetermeer (NL)**
- 41st GFV meeting
 - **8 June 2015 Geneva**



GFV items

Retrofit Heavy Duty Dual-Fuel Task Force (retrofit HDDF TF)

The development of a new UN Regulation for retrofit heavy-duty dual-fuel systems.

- A new regulation will include the requirements for the type approval of retrofit systems intended to be installed on a heavy duty diesel vehicle to enable its operation either in diesel mode or in dual-fuel mode.
- Only Euro IV, Euro V and EEV vehicles will be included in the first release of the regulation.



GFV items

Status of the new HDDF retrofit regulation

- Not yet ready to present an informal document to the GRPE for review.
- Nevertheless, a lot of progress has been made.
 - type approval process for retrofitting HD vehicles to dual-fuel
 - the retrofit system family and application range,
 - scope of the retrofit package (engine and complete retrofit systems)
 - methane emissions
- Solutions to deal with most of these issues were found.
- The TF has started drafting and the pace of the work effort is increased.



GFV items

HDDF retrofit type approval process

UNECE

Engine Retrofit System

Extensions and actual applications

Complete system

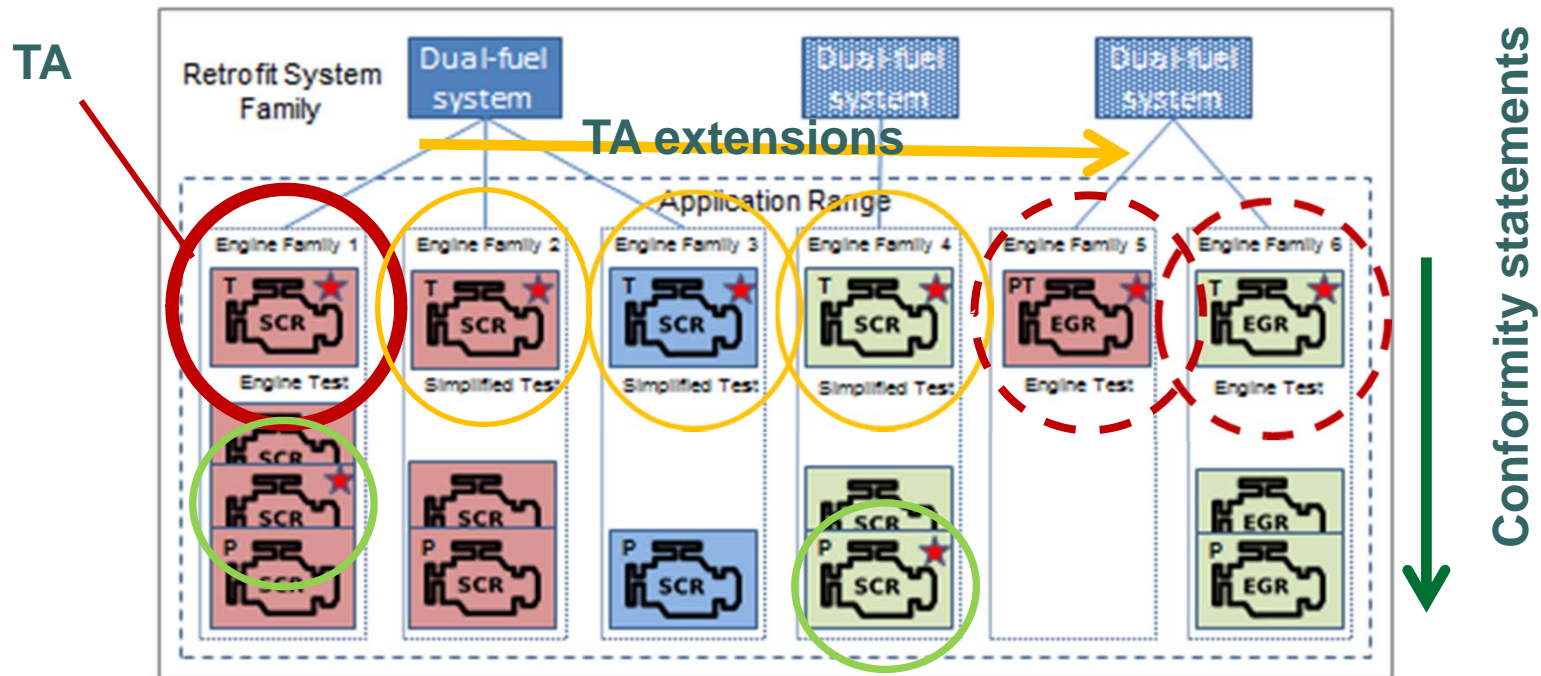
National

Vehicle inspection after retrofit

GFV items

HDDF retrofit system family and application range (AR)

System Family, AR and Actual Applications ★





GFV items

Complete retrofit system

- There is a desire to TA a complete retrofit system with the engine, interface and installation aspects of all gas components to be mounted in the vehicle.
- The approval of a complete/completed Vehicle Retrofit System will be described in the UNECE regulation (installation manual).
- Solutions for the installation aspects will be explored due to the different configurations of trucks/busses. Discussions ongoing.



GFV items

CH4 emissions

Difficulties

- To keep a balance between feasibility and complexity of the retrofit systems in order to permit the commercialization of the retrofit technology.
- Example: Forcing the implementation of a CH4 catalyst is generally considered as not economically viable on used vehicles. A conversion of a GHG to another less reactive GHG at high costs and no guarantee on durability of the after-market CH4 catalyst.



GFV items

CH4 emissions

In the new retrofit Regulation we will introduce two possibilities of the retrofit systems concerning GHG:

1. Possibility to claim CO2 reduction

- All emission limits (including the methane limit) for dual-fuel mode should comply with the R49.

2. Possibility without any claim of CO2 /GHG reduction

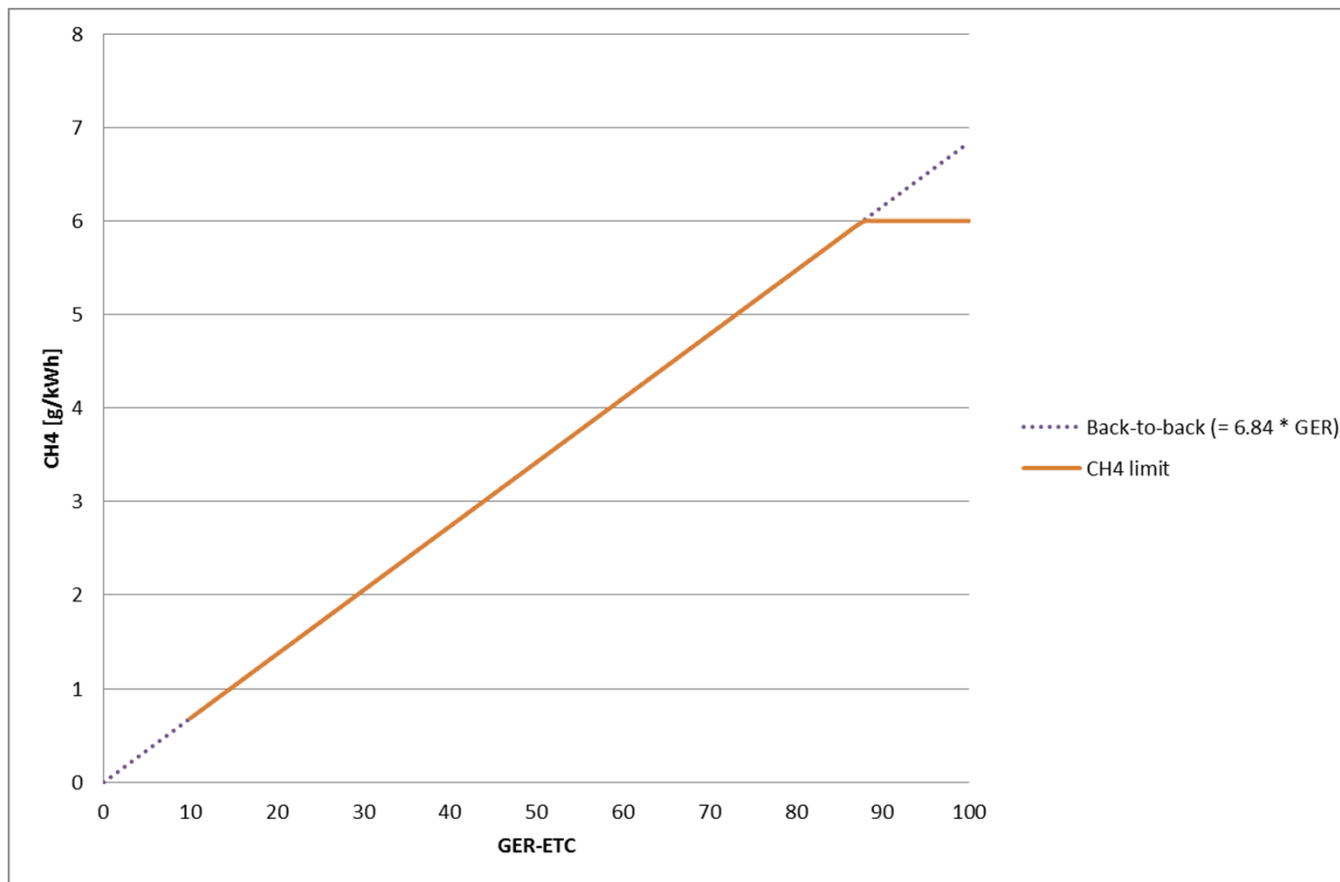
- The CH4 emissions shall not exceed the following Gas Energy Ratio (GER) dependent CH4 limit:

$$CH_4 \leq 6.84 * GER / 100 \quad \text{AND} \quad CH_4 \leq 6 \text{ [g/kWh]}$$

Based on back-to-back correlation with a cap on 6 g/kWh

GFV items

CH4 emissions limit vs. GER





GFV items

New issue concerning Torque

- OEM concerns regarding possible torque differences between diesel and dual-fuel operation (physical and/or CAN parameters)
- Possible solution (torque test) under development



GFV items

Retrofitted dual fuel vehicles on national level

The TF will investigate elements/guidelines to include in the new Regulation for Contracting Parties concerning the implementation on the national level for the approval of a retrofitted HD vehicle to dual-fuel.

- Check if the Vehicle Retrofit System is approved concerning the UNECE Regulation and if the engine/vehicle combination is installed in line with the installation manual.
- Safety check of the conversion in line with R67 (LPG) or R110 (CNG), including check of the components used.
- Specific attention for the installation of the (heavy) cylinders and the safety devices.



GFV items

HDDF retrofitted engines and vehicles

Timing/roadmap *delay from initial roadmap:*

Many topics still need more investigation and discussion. Drafting has already started and will continue.

Monthly f2f- and weekly web-meetings are scheduled.

- June 2015 71- GRPE: report
- January 2016 72- GRPE: informal document (planned)
- June 2016 73- GRPE: formal document (planned)
- November 2016 WP.29: adoption



GFV items

Other items

- R115 amendment
- **Information exchange on gaseous fuelled vehicle related issues in other forums (GRSG, WP.15, IW VPSD, EU)**



GFV items

R.115 amendment

- **GRPE-71-03 (GFV amendment R115 LPG & CNG retrofit)**
 - A GFV proposal (40-02) to amend the retrofit regulation R115, with the aim to simplify the communication model of approval for LPG and CNG vehicles.
 - eliminate the communication of the CO₂ emission and power figures of each specific vehicle.
 - relieve the retrofit system manufacturer of knowing in advance the original CO₂ emissions of all qualified vehicles.
 - at the moment of retrofit registration the administration can easily calculate the CO₂ emissions in gas mode multiplying the CO₂ factor for that specific vehicle (R.115 communication model) by the original petrol CO₂ emissions (COC).



GFV items

Information exchange on gaseous fuelled vehicle related issues in other forums (GRSG, WP.15, WLTP, VPSD, EU)

- **GRSG (general safety):**

- **R67 (LPG)**

- Preventing LPG flow to the petroleum or diesel tanks
 - Periodic inspections of LPG pressure relief valves

- **R110 (CNG/LNG)**

- Direction of discharging the pressure relief devices on CNG cylinders
 - Protection of metal CNG cylinders against corrosion
 - CNG type approval issue, alignment ISO, welded steel CNG cylinders,
 - Automatic and manual valves on LNG tanks

- **WP.15 (ADR/ Dangerous Goods Vehicles)**

- Allow LNG as a fuel for ADR trucks (adopted Nov 2014) In effect January 2017
 - CNG & LPG will be considered in November 2015 (for adoption January 2017)



GFV items

Information exchange on gaseous fuelled vehicle related issues in other forums (GRSG, WP.15, WLTP, IW VPSD, EU)

○ GRPE

● WLTP

- Effect on gaseous fuelled vehicles?

● VPSD

- GFV proposed definitions for bi-fuel, dual-fuel, mono-fuel and flex-fuel vehicles

○ EU

● RDE

- Effect on gaseous fuelled vehicles?

● Changes in Euro 6

- Methane issue



Next steps GFV

○ Next meetings GFV

- 27 October 2015 GFV (Brussels, DG Growth)
- GFV request to GRPE for a ½ day meeting during the 72-GRPE
