

34TH INFORMAL GROUP ON GASEOUS FUELLED VEHICLES (GFV) MEETING

PROCESS OF THE GFV HDDF RETROFIT ACTIVITY

André Rijnders
3 June 2014

Geneva
3 June 2014

FUNDAMENTALS & PRINCIPLES OF HDDF-RETROFIT

Fundamental issues

OICA (GFV 29-03)

- Retrofit vs Conversion
 - 1)Retrofit: fitting new elements of design to an approved engine system without substantially modifying its emission strategies (e.g. fitting a particulate filter).
 - 2)Conversion: fitting new elements of design to an approved engine system and/or substantially changing its emission or operating strategies (e.g. in view of letting it run with a different fuel)

FUNDAMENTALS & PRINCIPLES OF HDDF-RETROFIT

Fundamental issues

- **Discussion in GFV 29th**
 - not all the dual-fuel systems can be considered “conversions”, as defined by OICA.
 - conversions is a new working and definition and could be effect more kinds of modifications and Regulations, like R115, REC, chip tuning. (also written AECC comments)
 - The GFV participants agree to keep the historical wording “retrofit” system to avoid any confusion.
 - A sub-classification of retrofit systems of “substantially” modify emission and operating strategies like intrusive and non-intrusive systems.
 - Clarification needed for responsibilities after retrofit and for ISC (concerning the written CLEPA comments)

FUNDAMENTALS & PRINCIPLES OF HDDF-RETROFIT

Fundamental issues

OICA proposes three sets of requirements:

- 1) requirements for certifying a conversion system;
- 2) requirements for certifying a converted vehicle;
- 3) requirements for installing a certified engine on a converted vehicle

GFV concluded after discussion:

First start with highest priority and the “low hanging fruit” → approval of dual fuel retrofit systems.

FUNDAMENTALS & PRINCIPLES OF HDDF-RETROFIT

Fundamental issues

AEGPL (GFV 29-02)

- **harmonized method for the classification, evaluation and approval of:**
 1. dual fuel retrofit **systems** to be fitted in heavy duty road vehicles;
 2. dual fuel retrofitted **engines** to be fitted in heavy duty road vehicles;
 3. **retrofitted vehicle** type with an approved dual fuel retrofitted engine.

GFV 29th conclusion:

Concerns about loopholes with R49 when approving a HDDF retrofitted engine and HDDF retrofit vehicle with a retrofitted HDDF engine.

The most important part is HDDF retrofit systems,

→ start with the development of point 1 – dual fuel retrofit systems

Next meetings will focus and complete the discussion on HDDF retrofit systems. The GFV agrees to take the AEGPL text as starting point for further development.

HDDF RETROFIT ACTIVITY

Status of Retrofit Regulation concerning Dual-Fuel.

- **67th GRPE January 2014 Geneva.**
 - endorsed the GFV to develop a new UN Regulation for heavy-duty dual-fuel retrofit.
- **31th GFV on 29 January 2014 in Brussels**
 - OICA made a presentation on “approvals” structure that focused, in particular, on the need to regulate the “conformity of production” of the retrofit kit installation into the vehicle.
 - GFV agreed to primarily focus on the retrofit system “type-approval/COP” issues, as its first priority
 - OICA requested to include the possibility to get two separated type-approvals; one for the engine-related part and the other for the vehicle-related part.
 - GFV agreed to deal with a possible split of the whole system into two parts after having defined the provisions for the whole system type-approval.
 - GFV agreed to postpone Euro VI provisions for a next series of amendments to the regulation.
- **32th GFV on 3rd of April 2014 in Brussels**
 - Proposal was made that only Dual Fuel applications above 10% GER (Gas Energy Ratio) should be recognized as real dual-fuel.
 - The group agreed to set a minimum limit on GER in the new retrofit regulation and to provide as soon as possible also a draft amendment to R 49 in order to create a same regulatory treatment of OEM and retrofit.
 - First discussion on ‘family definition’ and the “application range” concept. More information on the concept was requested.
 - OICA, proposed to improve the requirements on the installation manual with instructions for a proper quality check after the installation.
 - OICA made two power point presentations: the first on HDDF Conformity of Production Principles (GFV 32-05) and the second on the ISC Liabilities Principles for installation and installers (GFV-32-06)

HDDF RETROFIT ACTIVITY

Status of Retrofit Regulation concerning Dual-Fuel.

- **Continuing of the 32th GFV on 3rd of April 2014 in Brussels**
 - OICA proposed to establish the same principles in line with R49 obligations of COP and ISC for the new retrofit regulation.
 - The retrofit system manufacturer is responsible for the converted engine in dual-fuel mode as well as diesel mode (unless otherwise agreed with original engine manufacturer)
 - Any liability after conversion is for the dual fuel system manufacturer.
 - Mandatory compliance of installers with ISO qualification standards or equivalent;
 - System manufacturers must deliver their systems only to qualified installers registered in an official list to be maintained over time;
 - Contracting Parties must implement a qualification process in accordance with pre-defined provisions.
 - Dutch reply is that the responsibilities against ISC obligation is also a major concern for national authorities (CP) how permit retrofitting of an approved and registered vehicle. (The regulations permit OEMs to request the exclusion from the ISC procedure for engines or vehicles that have been subject to any modifications)
 - Discussion on responsibilities as well as general liabilities.
 - The Commission clarified that 'liability' as set out in EU Directives and lies also outside of the scope of UN/ECE Regulations.
 - The GFV felt necessary to obtain a better understanding of the proposed qualification process within the UN/ECE 1958 agreement and the relevant EU legislative framework.
 - The HDDF Task Force under the chairmanship of Henk Dekker (TNO) started with their work on the bases of 2 proposals tabled by AEGPL (GFV 32-02) and OICA (GFV 32-03)

HDDF RETROFIT ACTIVITY

Status of Retrofit Regulation concerning Dual-Fuel.

- **33th GFV on 22 and 23 of May in Lyon (Renault Trucks)**
 - AEGPL presented the “Retrofit Systems Type Approval Principles.” (document GFV 33-05)
 - The following type-approval scheme was proposed:
 - the retrofit system ‘family’ (characterized by emissions) is defined as list of components characterized by criteria. The parent (retrofit) system installed onto the parent engine (a representative engine of the family) are then together validated by performance tests (emissions, OBD, etc.)
 - At the first type approval the application range (defined as the set on engines where the DF system family is approved to be fitted) matches with the engine family
 - Extensions of the application range can be issued to a new engine families (with a simplified testing procedures)
 - The GFV agreed that the approval of the (retrofit) system family should be valid only for a specific application range. How the type approval can be applied to an extended application range and its criteria should be clarified.
 - NGVA Europe presented a proposal to perform testing before and after conversions in both diesel and dual-fuel modes. (Document GFV 33-04).
 - Perform a CO₂ emissions test before and after the engine is converted and to understand the resulting differences between the diesel and natural gas modes.
 - Perform a PEMs test before and after conversion to demonstrate the ratio between CO₂ equivalent in the dual-fuel mode and (divided by) CO₂ in the diesel mode.

HDDF RETROFIT ACTIVITY

Status of Retrofit Regulation concerning Dual-Fuel.

- **Continuing of the 33th GFV on 22 and 23 of May in Lyon (Renault Trucks)**
 - The reason for the proposal is for commercial purposes to show the attractiveness of the reduced CO₂ and greenhouse gas equivalency levels of dual-fuel over diesel.
 - The GFV concluded that from a legislative perspective there is no need to adopt the proposed testing approach since there is no CO₂ requirement (yet) for HDV's, however the concept could replace the methane emission 'slope' concept in R.49 (Euro V).
 - The PEMs test for CO₂ purpose in this proposal is not yet clear.
 - The GFV will continue with this discussion on CO₂ at a later stage in the DF process.
 - The HDDF TF continued their work and implemented the elements concerning definitions and family concepts and application range

HDDF RETROFIT ACTIVITY

Timing:

- June 2014 69° GRPE: report and discussion
- January 2015 70° GRPE: informal document (if available)
- June 2015 71° GRPE: formal document (if available)
- Nov. 2015 WP.29: adoption

Organisation:

- GFV mean group will discuss the HDDF activity of fundamentals & principles & process
- Task Force retrofit HDDF activity technical implementation and drafting activity
- Chair Task Force retrofit HDDF: TNO (Henk Dekker)
- Secretariat HDDF TF → NGV global (Jeff Seisler)
- Meeting HDDF TF → to be decided by the TF (or GFV)

HDDF RETROFIT ACTIVITY

Excel sheet with
 “ Open Issue List”
 Document will be uploaded
 On UNECE webpage

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#	ITEM (HDDF)	Issue Status GFV Level	Solution 1 (proposed)	Solution 2	Solution 3	GFV discussion	Solution in Regulation
1		Closed issue					
2							
3	1 Euro IV and V		Only Euro IV and V			Solution 1	
4	2 Euro VI	Pending issue	No Euro VI until EU agreement	Euro VI in 2nd stage?		European Discussion	
5	3 Dual Fuel Type		Only Type B (no distinction)	Only Type 2 B	Only type B and GER > 10% (incl change in R49r05 and r06)	Solution 3	
6	4 Families		If the parent engine is not equipped with one or more devices listed above, engines with these devices are allowed	Family members should have the same emission control devices	Same R49 engine family and Manufacturer. Study when drafting the tekst	study possibility of different families for different purposes	
7	5 Compliance w/Emission Limits		original emission limits			solution 1 agreed	
8	6 Retrofit System approval		Priority topic of proposed regulation			solution 1 agreed	
9	7 Retrofit Engine approval		Engine approval R.49 applicable (also when installed in old vehicles)	OICA proposal to be discussed			
10	8 Retrofit Vehicle approval		See item 7	See item 7			
11	9 In-service conformity						
12	10 Retrofit vs Conversion		Only retrofit: possible distinction between retrofit types	OICA proposal to be discussed			

PLANNED MEETINGS FOR GFV AND THE HEAVY-DUTY DUAL-FUEL TASK FORCE

Next meeting of GFV and HDDF-retrofit Task Force:

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|---------------------------|---|
| 2 September 2014 | HDDF TF (Brussels-Eurogas/NGVA Europe offices) 10.00-17.30 |
| 24 September 2014 | HDDF TF (Brussels, DG Enterprise, Room 11A) 10.00-17.30 |
| 28-29 October 2014 | GFV-35/HDDF TF (Rome, hosted by AEGPL)
(Time to-be-determined) |
| 3 December 2014 | GFV-36 (Brussels, DG Enterprise, Room 5A)
10.00-17.30 |

The next GRPE session will be held on 13-16 January 2014

The deadline for the submission of official working documents is 17 October 2014