DRAFT- Pre-Approval

Meeting Minutes
43rd Meeting of the Informal Group on Gaseous Fuelled Vehicles (GFV)
13 January 2016
Palais Nations, Geneva
Room VII
09:30 – 12:30

I. Welcome and Introduction

1. Mr. Rijnders welcomed the group, with optimism for the New Year.

II. Adoption of agenda for today (changes/additions)

2. No changes to today's agenda were made.

III. Adoption of minutes of the GFV-42 on 27 October 2015 (Brussels)

3. Chairman requested adoption of the meeting minutes of GFV-42. There were no objections to the minutes of the last meeting and they were adopted without comment.

IV. Report and information exchange on Heavy Duty Dual-Fuel Task Force (Retrofit).

Exchange of views on draft Informal Document for GRPE. Mr. Dekker, chairman of the HDDF TF (retrofit) presented the status of the draft retrofit regulation. (Document GFV 43-06). Presentation highlights are included below in paragraphs 4-13.

4. The Task Force has had 13 teleconferences and 3 face-to-face meetings.
5. An Informal Document of the regulation is being prepared for submittal by the 14th March 2016. GFV documents 43-04 and 43-05 show the new regulation (05 shows the changes done based on the most recent work).
6. Only Euro V and EEV vehicles are included in the proposed regulation. Though this is a new regulation, it references Regulation 49 (heavy duty engines) throughout the draft.
7. The basic principles of the type approval process, issues and applications of the dual-fuel retrofit systems were presented. There were no questions following this section of the presentation.
8. Emission Tests: Engine test and simplified test. Initial type approval is based on an engine test and a for a type approval extension a simplified test will be prescribed. (Details of the simplified test method is still-to-be-developed and verified.) SEMS systems can be used for type approval extension.
9. Germany raised some questions about allowing testing on a chassis dynamometer and questioned the simplified test procedure. Germany will provide detailed comments and concerns in a written document.
10. Chairman Dekker explained that a back-to-back test option is provided, so long as it is as identical as possible for both gaseous fuels and diesel. Germany responded that chassis dyno testing for HDVs does not exist and has no procedures so recommending it in this proposed regulation may not be able to be validated. It is Germany's view that an entirely new Global Technical Regulation specifying chassis dyno testing would be needed and this cannot be created within this proposed regulation.
11. The concept of back-to-back testing is a fundamental principle of this regulation. Next to PEMS also chassis dyno testing can be used but must be validated. The issue of chassis dyno testing will remain open for further discussion based on Germany's remarks.
12. Methane emissions: Two options are provided: 1) emissions limits for D-F mode as specified in R.49; and 2) NOx, NMHC, PM and CO limits in R.49 would apply but

methane emissions shall not exceed the GER dependent CH4 limit as: CH4 ≤ 6.84 x GER/100 AND CH4 ≤ 6 [g/kWh].

13. Safety issues: There were OEM concerns about possible torque differences between diesel and dual-fuel operation (physical and/or CAN parameters). A torque test and CAN communication requirement has been specified in the regulation to take these concerns into account.

Next steps for a final (working) document on Engine Dual-Fuel Retrofit Systems

14. Mr. Rijnders stressed that OEM D-F vehicles are not yet on the market so retrofit systems approval is important. The Informal Document GRPE-72-12 has been introduced to the GRPE for discussion this week. Diagrams on the application range and system family has been added to help clarify the complexities of type approval for the type approval authorities.
15. Annex 1 Appendix 4 (compliance statement) has not yet been discussed at length but is a very important element. A 'good faith' declaration must be made by the system manufacturer that all their systems meet the relevant emissions limits. This is added as an example and should also include the list of actual applications.
16. Text on the Installation Manual has been provided but will need further consideration.

Presentation on Dual-Fuel Emissions (Document GFV-43-07) (Mr. Dekker)

17. CO2 specific emissions: There is good correlation with brake specific emissions but a possible problem exists due to the influence of H/C ratio. For LPG variations of CO2 is less than 10% and on O2 is less than 2%; For CH4 the influence on CO2 is less than 25% and for O2 the difference is less than 3%.
18. PEMS equipment provides a fairly accurate looking at the relation between power and CO2 (straight line) for diesel. For dual-fuel also the relationship between CO2 and power varies with the fuel ratios.
19. If O2 is measured instead of CO2 there also is a good correlation for diesel and dual-fuel.
20. Conclusions on CO2 and O2 measurements: 1) calculation of CO2 specific emissions for D-F has disadvantages; 2) the amount of O2 needed to release a certain amount of energy from an air/fuel mixture appears reasonably insensitive to the fuels used for a D-F engine. However, more validation work is necessary. Also, PEMS equipment does not always measure O2 emissions. So using O2 emissions seems to be a difficult approach. As such, back-to-back measurement was used and 'shall be lower than or equal to the operation on diesel.' A derogation is possible for CO; no CH4 requirement (no diesel value for CH4); and discussion is on-going about a possible NMHC derogation.
21. Back-to-back approach: there would be a choice of test bench measurement (brake specific emissions); on road test using PEMS (average emissions in g/second). Use of chassis dyno will be under further discussion depending on comments made from Germany.
22. Mr. Rijnders expressed confidence in the draft regulation yet there is concern about the next steps in validating the specific testing methods. Mr. Dekker said that a back-to-back approach was preferred over using O2 emissions because these have not yet been validated. But the on-road test and test bench measurement is validated but not the chassis dyno approach. More data is needed from the manufacturers in order to validate the method. But the chassis dyno is more popular with D-F suppliers yet it has not been an approved methodology, therefore, it is possible that this will be removed from the proposal. Also there is not much time to validate the approach. Mr. Rijnders asks, therefore, if chassis dyno approach can be removed for now and if, in the future it can be validated, it can be reinstated. The GFV will await a document from Germany

stating their concerns and the next GFV (23rd February 2016) will consider whether or not to remove the chassis dyno testing option for testing.

V. Report on other gaseous fuels activities/issues at UNECE/EU (Jeff Seisler, NGV Global)

ADR, 2015 results; Upcoming for 2016

23. LNG, CNG and LPG have been adopted as fuels for ADR-certified trucks. Initially it was planned for introduction in the 2015 version of the ADR regulation but now will be included as 'legal' as of the publication of the January 2017 ADR regulation (which is updated every two years). Countries now can have multilateral agreements (as exists in 5 European countries) to allow gaseous fuel ADR trucks in advance of 2017.
24. Next issue is fuel content on trucks. Gaseous fuel proponents are advocating that energy equivalent should be the method to make create an even approach for all fuels (using the diesel limit of 1500 liters as the basis, only in equivalent energy).

GRSG proposed amendments in 2016

25. *LNG Fuel connector.* When R.110 was amended to include LNG (2013) a reservation was left open for the LNG fuel connector, which was still under consideration at ISO. The Netherlands will be tabling a new amendment to include the ISO provisions for the LNG connector into R.110. This is relatively non-controversial and will help promote global harmonization of the NGV regulations and standards.
26. *New proposal for aluminum parts in LNG tanks* (a proposal by the Salzbuger Aluminium Group, in Austria) has been raised. The company raising the issue will be asked to prepare a detailed Informal Document detailing the materials, construction and testing in accordance with ISO, to the best extent possible.

Gaseous fuels news (legislation) from Contracting Parties, if available (EU, Japan, USA, India, etc.)

27. There are no other comments from CPs or others with any additional information that might be of interest to the GFV.

VI. Any Other Business

28. No new business points were raised.

VII. Planning next Meetings of GFV & HDDF TF

29. GFV-44 is scheduled on the 23rd February 2016 at the RDW offices in Brussels.
30. HDDF TF schedule: The next teleconference will be on 26th January from 14.00-16.00. At this moment these teleconferences will be planned bi-weekly but these may increase due to the amount of work on still-open dual-fuel retrofit regulatory issues.
31. March 14th is the deadline for the next GRPE Working Documents, which is the target for the HDDF TF final regulation.

VIII. Closing

Attendees

André Rijnders (Chairman) RDW-NL
Henk Dekker (HDDF TF Chairman) (by telecom)
Jeff Seisler (Co-Secretariat) NGV Global
Salvatore Piccolo (Co-Secretariat) AEGPL
Alberto Castagnini (AEB)
Flavio Mariani (NGVAE)
Céclie Favre (AECC)
Leif-Erik Schulte (TÜV Nord CD)
György Szabados (KTI-Hungary)

Raymond Sonan (CCFA)
Matthias Tappe (CLEPA/Bosch)
Yu Jia (China-MIIT)
Liang Ji (China-MIIT)
Hitoshi Torii (NTSEL-Japan)
Gert Jan Grootveld (Netherlands)
Onducj Sipek (DEKRA, Czech Republic)
Andrew Whitehouse (Clean Air Power) by telecom