

**MEETING MINUTES
INFORMAL GROUP ON GASEOUS FUEL VEHICLES
30 SEPTEMBER 2008
BRUSSELS (CLEPA OFFICES)**

WELCOME

Opening remarks by Pierre Laurent (CLEPA).
Opening comments/welcome by Chairman André Rijnders

REVIEW OF AGENDA AND ADOPTION OF AGENDA

- Agenda agreed upon with no additions
- Minutes of previous meeting (3 June 2008) adopted with no exceptions

REVIEW OF 56th MEETING OF GRPE (June 2008) and update of related UN issues

Mr. Rijnders reviewed the activities of GRPE and WP29 from June 2008

Report on the meeting of GFV:

- Regulation 83 issues were raised: OICA plug-in hybrid issue; petrol ECE TRANS WP29/2008/112 is on the table
- Regulation 101 plug-in hybrid; reference fuel for LPG and natural gas explained. ECE Trans WP29/2008/113
- Regulation 115 from AEGPL taken off the table.
- next GFV meeting is on Tuesday, 13 January 2009 at the UN (Geneva) in the morning

WP29 meeting: 11-14 November 2008

- WP 29/2008/61 dealing with OBD finalized and to be launched
- Regulation 115 (annex 5) changes in force 11 July 2008.
- November WP29 upcoming: Regulations 83 and Regulation 101;
- GRSG amendment to 110 (PRD) document WP29/2008/99 should be approved at the upcoming meeting in October 21-24.

BRIEF PRESENTATION

Mr. Radzimirski (Poland). Document GFV02-2 presented in June 2008: Regulations 49 and 83- LPG Reference fuel:

LPG Reference fuel (GFV-02-02)

- There are problems with the interpretation of the existing specification on the Composition of LPG reference fuel in Regulation 83, Annex 10A. It is not clear what 'balance' means. Changing the order of items should clarify the problem. Possibly a footnote could provide the clarity (balance= 100 – (minus) C3 – (minus) <C3 – (minus) >C4. (Balance issue related to propane/butane composition).
Action: AEGPL will prepare a footnote for Regulation 83 to clarify the situation.

- Different composition of LPG reference fuels B in Regulations 49 (revision 4: Emissions in heavy duty vehicles) and Regulation 83. (Entered into force 1 February 2008.) Reference fuel on page 390 is included. There is a difference in Olefins; max. 14 percent volume in Reg.49; and max.15 percent volume in Reg.83. These should be the same. There is a discussion about what fuel is available from the supplier (and how the bid specification is made from the customer) and what fuel might be available in the open market (although heavy duty vehicles *tend* to be fuelling in private fleet locations.) The issue is not considered 'urgent' but the regulations should be consistent.
Suggestion: Propose a footnote with a maximum of 15 for Olefins; the Motor Octane Number might be lower (by 0.1), however, this is negligible.
Suggestion: Give the manufacturer latitude to use a range of fuels while keeping the limit values.
Action: A concrete proposal in Regulation 49 is required for the two optional fuel compositions to satisfy the needs for different types of vehicles (i.e. delivery truck vs. AEGPL will take a lead with participation from GFV members/and the Chairman.
- HC ratio specified in Regulation 49 and Regulation 83 is now 2.525 in both documents while the reference fuels (A) are different. The HC density calculated (average of the fuel A and B) for the ratio is equal to 0.651 in Regulation 83; and 0.652 in Regulation 49. The impact of the difference is about 0.5% on fuel consumption.
Action: The ratio should be re-calculated to see if it is necessary to change the HC density to align with the specific reference fuel (i.e. the current reference is to three decimals and the measurement accuracy probably isn't to that level of specificity)

WORK ITEMS

Regulation 49 and 83 LPG reference fuel: dealt with above.

Proposal for Draft Amendment to Regulation 101 – gas fuels (GFV-02-03) (Mr. Radzimirski)

- An important part of the text concerning the fuel to be used for CO₂ testing in paragraph 5.2.4. in version 1 has disappeared in the final version 2 of the regulation 101. The Chairman noticed that in the document ECE/Trans/WP29/2008/113 already on the agenda for WP29 the missing paragraph is included.
- Also in Paragraph 5.2.4. of R101: In Regulations 83 and 101 the fuel density is calculated for natural gas for G.20 and G.23, but should be calculated for G25 instead of G23. This makes it inaccurate by 4%. (0.654 kg/m³ for NG calculated for reference G20 and G23, specified in footnote [3]) But the reference fuels should be re-calculated at 0.631 density for NG. The formula must be changed to account for G23 to G25. A calculation must be provided (or summarized) to support the change, first through GRPE. But the affect of the change must be evaluated. Options: Use one formula for the two fuels taking an average; or correct the formula done for each fuel A and then B and make the average.
Action: Mr. Radzimirski and Mr. Cagnolati will attempt to work out the new calculation (while showing the old calculation is not correct).

Proposal for Draft Amendments & Comments to Regulation 115 (GFV-02-04) (Mr. Radzimirski)

- Intention: Limit the scope of application for Euro 3, Euro 4 and later vehicles. The majority of vehicles are approved under Directives 70/220/EEC and 88/77/EEC or 2005/55/EC and not by R83 or R49. Because the Regulation 115 is referring to ECE

Regulations 83 and 49 it could be seen that R115 do not limit the scope of EU Directives and that R115 could apply also to Euro 1 & Euro 2 vehicles with an EU approval certificate. The working group agrees that this is not the intention and this option may not be used. An amendment is needed.

- Proposal to amend 1.4: for retrofit systems, for M and N, *type approved pursuant to Regulation 83 or 49, or equivalent EU Directives....with the exception of: (f) vehicle type-approved pursuant to Directive 70/220/EEC and Directives amending this Directive, earlier than Directive 98/69/EC,*
- Vehicles approved under Regulation 115 (and which is on the Euro 3/4 list) then the approval/certification is up to the national approval process. It might be possible to put a reference in the UNECE regulation to Euro regulations, if nothing more than to clarify the scope.
- Conclusion: When European Regulations (83) are changed, Reg.115 has to be upgraded, for instance, to Euro 5 and 6. Although national approvals under Reg. 115 would be possible, still the UNECE and European regulations must be harmonized ultimately. But there is going to be a time-lag between the introduction of higher level, more stringent European regulations to the time when Reg.115 can be adapted. AEGPL agrees with the objective of the amendment and will seek the right wording with M. Radzimirski. Nevertheless, AEGPL recalled participants that type approval of R115 kits to euro 5 vehicles must be allowed in order not to create a damaging gap in the market of gaseous fuels feeding systems.

LPG/NG Switchover Time from Petrol (Mr. Radzimirski)

- Purpose is to draw attention to the problem of switchover time.
- Problem occurs that in-use performance of the LPG vehicles in Poland at times have much higher emissions than petrol or than the existing EU emissions regulations.
- No concrete proposals are given how to solve the problem, with several options available from stringent to lenient.
- The Euro 5 regulation, to be applied as from September 2009, specifies 60 second switchover.
- Time limit of the switchover is an issue; the measurement technique is another issue.
- This same issue will apply for CNG systems, but the timing may be different; but there should be limit values identified. But the issue with methane HCs in the light off period might be solved by the discussion (and solution) of the NMHCs. Time range should be limited to 60 seconds.
- *Action:* AEGPL will craft a suggested approach and proposal on this topic (for Euro 3 and 4), bearing in mind that no provision is required for bi-fuelled European type approved vehicles complying with Euro 3-4 regulations. Further discussion on Euro 5 would follow, but the solutions may be different.

On-Board Diagnostics for Heavy Duty Gas Engines (Renault-Volvo; Mr. Renaudin by speaker phone)

- See New Document
- Regulation 49 rev.4 (13 August 2008). Annex 9A is applicable for Euro IV, V and EEV
- Annex 9B (presently not applicable) is the transposition of the WWH-OBD GTR and should be referred to Euro VI legislation.
- CNG engines will be equipped with an OBD system as from Euro V, as required in Table B of para. 1.1.
- But Euro V regulation does not contain any specific provision for gas engines; some components not monitored by diesel OBD systems

- Possible adaptation of R49 to gas engines. Adaptation should be achieved by the Informal Group GFV to have gas experts involved and would not necessarily be required to be approved by WP29.
- Most provisions set for diesel engines are applicable to gas engines: OBD test cycle; failure classification concept; alert, recording and counters; some monitoring methods; off-board communication principles. Some new provisions need to be introduced for monitors of gas-specific components.
- Suggestion: Launch a dedicated Task Force to adapt Annex 9B of R49 rev.4 to gas engines. Present an informal proposal to GRPE (January 2009); have approval in June 2009; approval by WP29 in November 2009.
- Comments: Mr. Rijnders indicates that this is well within the scope of the GFV. What is the Commission's reaction?
- Mr. Steininger: Overall a good proposal as it stands. Timeline is sufficient to integrate it into Euro 6 implementing legislation. A draft prepared by the end of 2009, in ECE regulations, could be integrated into the European legislation; not easily but it could be possible. We should start to work on the technical substance.
- Mr. Renaudin suggests two day meetings in October and by December to prepare informal documents for GRPE. We need both OBD experts and HDV gas experts. Experts from member states also would be desired. Subject to the final agreement of Renault-Volvo management, Mr. Renaudin could provide the secretariat function to such a task force.
- Meeting times: 13th November 2008; and 4th December 2008. (Final proposal should be ready early in October 2009, in advance of WP29.)
- Interested parties (especially OEMs) will need to contact Jean Francois Reading¹ to participate, with copies of intentions to the Chairman and co-secretariats of GFV. All GFV experts should search for experts with specific focus on HDV engines as well as OBD.

Adaptation to technical progress and correction of provisions for M2, M3, N2, N3 vehicles (Mr. Radzimirski) Document GFV-02-04

- 13-mode test does not apply to Euro 3 and later vehicles
- The proposal refers only to conversion of diesel engines to SI gas engines; not for dual fuel engines.
- Proposed to amend paragraph 6.1.2.6. M. Radzimirski asked the audience if it would be good to include non-road mobile machinery, like forklift trucks, or those type approved under Regulation 96).
- Dual fuel could later be included as well; but the GFV has indicated that the OEMs must first support changes in the regulations.

Other small changes for 115 (GFV-02-04)

- (see document for details)
- Changes can be considered following introduction of AEGPL draft language on previous issues.

¹ Jean-Francois Renaudin
 Head, emissions and OBD legal issues
 Telephone: +33 4 7296 4874
 E-mail: jean-francois.renaudin@volvo.com

AEGPL cannot, at this time, indicate when their commentary and documentation will be prepared for discussion at another meeting prior to January 2009. Most likely the proposal will come in December, so the next discussion will be in January 2009 in Geneva. AEGPL stressed again that the LPG industry is committed to enhance dramatically regulation 115, but recalled to the participants that this regulation addresses the retrofit industry, an industry working with limited information from car manufacturers making sometimes very difficult or impracticable to reach the OEM requirements for bi-fuelled vehicles.

New Document Provided by the Chairman: Proposal for Draft Amendment to Regulation 115: Non-Methane Hydrocarbon Standard (NMHC) (André Rijnders, RDW-NL)

- Long time discussion in Europe (and in past the US) about the creation of an NMHC.
- Strategy is to bring up the discussion in the context of Regulation 115 (not Regulations 83 or 49)
- Refer to items in New Work Item:
- HC + NO_x has been eliminated in the different articles
- Article 6.1.2.6: Regulation 49, Heavy Duty Vehicles would be reserved for natural gas and LPG, if required.
- Proposal to NMHC is linked to petrol vehicles for Euro 4 (0.1 g/km THC). Euro 5 has both THC and NMHC limit values. For retrofit vehicles it would mean measuring methane and NMHC separately.
- In Regulation 83 there is no procedure specified to measure NMHC; so it is necessary to include the procedure (Mr. Radzimirski). (This must be checked and clarified in the regulation.) There is a test procedure in Regulation (EC) 715/2007.
- This proposal would create an NMHC limit that would be acceptable technically and politically. The methane standard would be raised to 200 mg/km ($200 \times 0.5 = 100$ mg/km). The NMHC limit will be lowered. Effective limit of NMHC would be 50 to ~67 mg/km ($67 \times 1.5 = 100$ mg/km).
- With good lambda control and methane catalyst an OEM can fulfill the 100mg limits, but it is expensive and very difficult.
- The argument is made that NMHC allows the important retrofit industry to maintain good quality conversions; the establishment of a methane cap still has the effect of protecting the environment.
- The Commission raises the issue that methane has been identified as a contributor to tropospheric ozone. (from one study from Princeton University, as noted by Mr. Seisler.)
- Commission indicates that for Euro 4 cars this might be acceptable. For Euro 5 it would undermine the current regulation.
- General discussion about the virtue of NMHC including harmonisation with US regulations; that OBD only looks at NMHC and not methane; and that the NGVs provide an infinitesimal amount of methane into the atmosphere compared to naturally occurring methane sources. Also the NMHC standard (1999) for HDVs has been successful in motivating OEMs in producing Environmentally Enhanced Vehicles (EEVs).
- The debate will be different (and continued) for Euro 5/6, and there will be concerns from OEMs about changing methane standards for retrofits. But this might be a motivating factor for OEMs producing NGVs to support the reconsideration of the THC for NGVs (or clarify THC as a methane cap or another solution that addresses environmental realities and political concerns for the environment.)
- The key argument is to make it possible for the retrofit industry to provide NGVs at the Euro 4 level. Euro 5 in Europe involves another more complex debate.
- The proposed limit values for hydrocarbons are not being changed in this proposal; the values are being redistributed.

- Next Steps: Send the European Commission an accompanying note:
 - Current cap of petrol vehicle with a catalyst and the added costs
 - Argument of the environmental impact on methane (including the tropospheric impacts addressed by the Princeton study)
 - Make it clear that this is for Euro 4 and that it is beneficial within this context.
 - Provide a bit of a history in the development of NMHC/THC issue over the years
- We will make a formal Powerpoint presentation for the January 2009 GFV meeting including an informal document, if we can agree in principle with the idea proposed by Mr. Rijnders.

Meeting End

Mr. Rijnders closed the meeting at 17.00, with thanks for all attending.

16 attendees (+Jean Francois Renaudin (speaker phone link for HDV-OBD issue))

André Rijnders (RDW-NL)

Arnaud Duviolguerbigny (AEGPL)

Jeff Seisler (Clean Fuels Consulting/IANGV)

Henk Dekker (TNO)

Stanislaw Radzimirski (Motor Transport Institute, Poland)

Francesco Cagnolati (LandiRenzo)

Antonio Erario (Italian Ministry of Transport)

Salvatore Piccolo (AEGPL)

Juergen Henke (VDO/ Continental)

Stu Showler (OICA)

Aldo Bassi (ISO)

Pierre Laurent (CLEPA)

Flavio Mariani (ENI/NGVA Europe)

Nicolaus Steininger (DG Enterprise and Industry)

Jose Pablo Laguna Gomez (DG Enterprise and Industry)

John May (AECC)