

Meeting Minutes
LNG TASK FORCE
3 NOVEMBER 2011
BRUSSELS
DG ENTERPRISE, BREY BUILDING
(Room 07/286)

I. Welcome & introduction of the members

1. Introductions around the table of the members (see list below)

II. Approval of the minutes of the previous meeting (Document LNG TF-01-04)

2. No comments or changes were made to the previous meeting minutes.

III. Approval of the agenda for today's meeting (Document LNG TF-02-01)

3. No changes to the agenda. LNG venting/boil-off will be a topic added for discussion, at the request of the Informal Group on GFV
4. Before we do the line-by-line review and hear comments re: storage (Peter Murray), Westport will present issues associated with vehicle boil-off.

IV. Use of the Template to make comments on R.110 suggested changes (Document LNG TF-2-04)

5. Mr. Dijkhof reviewed the template that should be used by any participants to make comments on the documents.

V. Review of the current work (Document LNG TF-02-02: R.110 LNG version, (P. Dijkhof with Daimler comments))

6. Mr. Dijkhof reviewed the document with proposed amendments done so far.
7. Questions raised by Daimler about Annex 4D: Provisions regarding the approval of the CNG/LNG pressure regulator, whether there are enough differences between CNG and LNG systems to call for separate language or address these systems as 'the same.' After discussion it is to separate CNG and LNG regulators. (Annex 4D applicable to CNG; LNG can be dealt with in Annex 4M.)
8. Discussion on Annex 4H (Daimler): Provisions regarding approval of the electronic control unit, along the same lines as above (7). Decision is to treat the control units – CNG and LNG – as the same.
9. Discussion on Annex 4Q: LNG Fuel Pump. Westport indicates that their system has a fuel pump inside the fuel tank and raises the question if this should be dealt with separately in another annex. Mr. Dijkhof indicates this can be dealt with as a 'multi-functional' system.
 - Mr. Murray (Chart) says that the ISO12614 has, so far, created documents on about 25 separate components. There is a danger that new regulatory language would be required every time a new variation of a specific system is created (especially for new and different markets). One resolution is to focus on the systems that specifically need attention related to safety issues or that they are safety components. Mr. Dijkhof reminds the group that R.110 deals with safety of components as opposed to just dealing with components having to do with safety.

- Mr. Dijkhof suggests differences of the pump location (inside the tank or outside the tank) can be described within the annex.
10. Following a discussion on fuel lines and the way they should be treated, a new Annex 4R is added: LNG fuel line and couplings.
 11. There is a general discussion about the need for detailed regulations, component-by-component or whether to be more generic. Some countries in Europe take the approach that components must be specified or the system, without a component specified, might not be homologated. An approach that takes a multi-functional view can be more flexible to incorporate specific component differences and to incorporate new developments in each system or component. Mr. Dijkhof proposes to deal with 'multi-functional' aspects of systems but, where needed, new annexes for specific systems can be added as determined necessary.
 12. Annex 5: Test Procedures. An Annex 5P has been added for LNG low temperature test (below -40°C) since it is specific to LNG.
 13. Annex 7: Provisions regarding LNG identification mark for public service vehicles. Wording/title is conformed to the existing language for CNG in Annex 6. A question is raised about what is defined as a 'public service vehicle.' (The 'label' would be something visible on the exterior vehicle body.)
 - There is a discussion as to whether all LNG vehicles should be labeled or just limited to 'public service' vehicles or to further specify M class vehicles being labelled. Volvo indicates that in the French version of R.110 'public service' is translated into 'public transport', which suggests just buses and no other vehicles.
 - Vehicle labeling (and which vehicles should and should not be labeled) is not consistent, particularly between hydrogen, CNG, LNG, etc.
 - Question is raised whether LNG is more similar to LPG (since LPG also have venting provisions). The LPG regulation regarding vehicle signage (R.67) is specified and limited to M2 and M3 vehicles (buses and trucks) and no labeling or signage is required or used for passenger cars (M1).
 - The point is made that in Europe, the OEMs do not want any fuel labeling on the outside of passenger cars. In North America, NFPA has required all natural gas vehicles to be labeled as CNG/LNG for the purposes of alerting fire fighters to the different fuels on board. It is pointed out that in the UK labelling is not an issue because fire marshals tend to treat all vehicle fires in a similar manner, regardless of their fuel.

At this point the group defers to the presentation by Westport on 'What is Boil-off?' Document LNG TF-02-05). Using a theoretical 400L tank, and not taking into account ambient conditions and effect, the amount of vapors vented to lower the tank pressure from 15.9 bar (230psi) to 14.8 bar (210 psi) is 3.46kg per event. This represents 2.6% (by mass) of the initial amount of liquid in the tank. In North America LNG vehicle tanks are designed to contain the LNG for 5 days without venting (by code). For normal road operation (when the vehicle is in regular use) there is no release of natural gas to the atmosphere. (This would include parking: to be taken up at the next meeting of the Task Force 03.)

 - Suggestion is made that we do not deal with the marking and identification issue at this moment. Take a note from the Heavy Duty Dual Fuel Task Force: some issues are 'low hanging fruit' and the other more challenging issues need to be set aside for further discussion in future in order to continue with the bulk of the work.
 14. Section 2: Definition and Classification of components;
 - New Class 5 added: Parts in contact with Liquefied Natural Gas,

- Part 2.2 (Specific components): add new sections: (k) non return valve or *non-return valve*; (w) vaporizer; (x) natural gas detector; (y) fuel pump.
 - Below section 2.2.1; flow chart; new decision branch added: temperature <-40°C
 - Fig.1.2 Add LNG to 'CNG Compatibility'; added new column on 'Low temperature test <-40°C' and under 'Class 5 Performance test as 'X' (Applicable); Change 'X' to "A", (As Applicable) under the following columns in the table: Corrosion Resistance; Vibration Resistance; Ozone ageing; leakage test (internal); 'Dry Heat Test'; Leakage Test (external).Leakage test (internal)
 - Section 2.3.1.a: Discussion on the use of 'tank' versus 'vessel'. Language determined is: "A tank can be any storage system used for liquefied natural gas".
 - Sections 2.4 and 2.4.1: A discussion of 'type' of cryogenic tank goes on at length. There is only one broad 'type' of LNG tank, as opposed to CNG, which have four *types*. *Type* of container will appear in a new Annex, Section 3A and 2.4.1 'Type of ~~eryogenic~~ (removed) tank' means tanks which do not differ in respect of the dimensional and material characteristics as specified in new Annex section 3B.
 - New sections added: 2.27 (Vaporizer); 2.28 (LNG); 2.29 (CNG); and 2.30 (Boil-off); 2.3.1(venting management system')
15. Part 1: Approval Of Specific Components of Motor Vehicles Using Compressed Natural Gas (CNG) *and or Liquefied Natural Gas (LNG)* (added) In Their Propulsion System Section 3 now split 3A and 3B (details as to references in the rest of the document will be changed in editing, not today)
16. Section 4: Markings
- New section 4.4 added 'Every tank shall also bear a marking plate with the following data clearly legible and indelible: manufacturer, serial number, gross capacity (litres),the marking 'LNG', approval marking according to paragraph 5.4 and the working pressure (MPa).
17. Section 5: Approval
- Section 5.1.1: corrected references to paragraphs 6.12 and 6.14
18. Section 6: Specifications Regarding CNG *and or LNG* (added) Components
- Section 6.1 edits reference to LNG and added "For LNG components see 6.12 to 6.14.
 - New sections 6.12 – 6.14 added
19. Section 9: Conformity of Production
- New section 9.4 For LNG tanks...reference to Annex 3B
 - Added other references to new Annex 3B
20. Part II: Approval of Vehicles: Section 17: Requirements for the Installation of Specific Components for the Use of Compressed Natural Gas in the Propulsion System of a Vehicle (added) and Liquefied Natural Gas
- Section 17.1.5. The systems shall show no leaks (i.e. stay bubble-free for 3 minutes.) Suggested change is to: The CNG and/or LNG system shall be pressurized at the nominal working pressure and tested for leakage with a surface-active agent without the formation of bubbles for three minutes or by using a demonstrated equivalent method.
 - Other references in this section 17.1 to 17.3 edited and/or added 'and/or LNG'.
 - Section 17.3.4.5 changed to 'LNG receptacle'.
 - Section 17.3.4.6: LNG natural gas detector. Discussion about the need for a gas detector, particularly since LNG is not odorized. The UK does not mandate on-board gas detectors. The term is left in the language.
 - All the items in 17.1 – 17.3 now includes all the components called out in the ISO LNG standard (Peter Murray, Chart).

- Section 17.4 Installation of the container or tanks. Editorial changes are made to add 'and/or tanks'
 - Section 17.5 Accessories fitted to the CNG container(s) remove 'cylinder' as well as in other parts of 17.5 to apply to CNG and/or LNG
 - Section 17.6 Rigid and flexible fuel lines. Pure stainless steel is required for LNG (due to potential for embrittlement at cryogenic temperatures) where as CNG can use stainless and/or corrosion-resistant coating. 17.6.1 added CNG (to allow both materials) and new 17.6.1.1 'LNG rigid fuel lines shall be made of seamless stainless steel (eliminating the possibility for other materials).
 - Section 17.6.2 added Class 5 (LNG) vehicles.
 - Section 17.6.3 added CNG at the beginning (flexible fuel lines) and added: "LNG Flexible fuel lines shall fulfill the requirement of Annex 4R."
 - New Section 17.6.9: "LNG fuel lines shall be insulated or protected in those areas where low temperature can damage other components and or injure people."
 - Sections 17.7 through 17.10 to add *and/or LNG* in editorial changes or left as is where the passages apply to both CNG and LNG (and were CNG is not specified). For sections applicable only to CNG '*For CNG*' is added.
 - New Section 17.8.2: "An automatic valve shall be installed as close as possible after the vaporizer in the LNG system."
 - Section 17.10.2. Vehicles on dual-fuel. Tentatively remove this section but consult with the Heavy Duty Dual Fuel Task Force. As stated now (and amended by ENGVA in 2003) it deals with conforming to national emissions requirements and does not deal with safety.
21. Annex 1A Essential Characteristics of CNG (added LNG) Components
- 1.2.4.5.2 Pressure regulator (add CNG, as this applies to CNG and LNG is dealt with in the new Annex).
 - Editorial changes to other elements in section 1.2.4.5 that are specific to CNG: 'CNG' added as appropriate. Where it is appropriate for LNG as well, LNG is added.
22. Progress for the day is stopped at Annex 1B. Mr. Dijkhof will continue through the document to make suggested annotated changes for discussion.

VI. Any other business

23. Question from Volvo regarding the logistics of making these amendments: Due to the extensive nature of the changes we will ask the GRPE Secretariat (Mr. Hubert) if an entire new document can be created with the new (after adoption) amendments or if there is another solution, and what might be the timing of changes to documents that would be in a transitional period.
- The secretariats/chairman will approach Mr. Hubert (secretariat to both GRPE/GRSG) regarding the logistics and procedures consistent with those in WP29.
24. Westport and Chart to work on language regarding pumps.

VII. Next meeting scheduled

Tentative dates could be February 2 or February 9, 2012

VIII. Meeting Close

(See below: Attendees)

ATTENDEES

Paul Dijkhof (Kiwa)

Jeff Seisler (NGV Global/Clean Fuels Consulting)

Jaime Del Alamo (NGVA Europe)

Mihai Ursan (Westport Power)

Matthias Riemer (Daimler)

Bernd Reinauer (Daimler)

Peter Murray (Chart)

Andrew Whitehouse (Clean Air Power)

Nathanael Crut (Volvo)

Jean-Louis Chazalatte (Volvo)

José Burgos (IDIADA)

José Luis Pérez Souto (IVECO)