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RDW

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Reason to start LNG task force

- 2008 request for consultancy on LNG truck from the private sector.
- 2010 Dutch LNG truck finished and approved by the RDW.
- More demand from the market
- Heavy Duty Dual-Fuel Task Force (HDDF TF) work begins June 2010 to amend Heavy Duty Vehicle Regulation (UNECE) R.49. LNG operating systems included but no vehicle regulations exist.

LNG TF approach / goal

- Inventory of the current regulations
- Identify Inconsistencies between regulations
- Modify R110 or create a new regulation for LNG
- Be ready in time (before 2013)
- Involved a wide range of key industry stakeholders and experts to achieve consensus
  - Engine suppliers
  - LNG specialists
  - Regulatory experts
  - NGV Global & NGVAE

Overview standards at the start

ISO/TC22/SC25 "Road vehicles using gaseous fuel"

- WG4: "LNG components on board"

- **WD 12617-1 "Connector for refuelling LNG vehicles"**
- **WD 12614-1 "LNG on board components: General requirements"**
- **WD 12614-2÷24 "LNG on board components: Components" (excluding components downstream vaporizer)**

- WG3: "CNG components on board" (downstream vaporizer)

- **ISO 15500 – ISO 15501 series (*in revision*)**

Overview standards at the start

ISO/PC252 "CNG and LNG Filling Stations"

WG1: "CNG Filling Stations"

WD 16923 "CNG Stations for fuelling vehicles"

WG2: "LNG and C-LNG Filling Stations"

WD 16924 "LNG Stations for fuelling vehicles"

Overview standards at the start

ISO/TC220 "Cryogenic vessels"

CD 12991 "Liquefied Natural Gas (LNG) - Transportable tanks for use on board vehicles"

[ISO 13984, ISO 21029-1, ISO 21011, ISO 21013-1, ISO 13985]

Miscellaneous documentation

ISO/TC22/SC25 N°329 "Standardization LNG System & Components"

Inconsistencies between standards and standards and between standards and regulations.

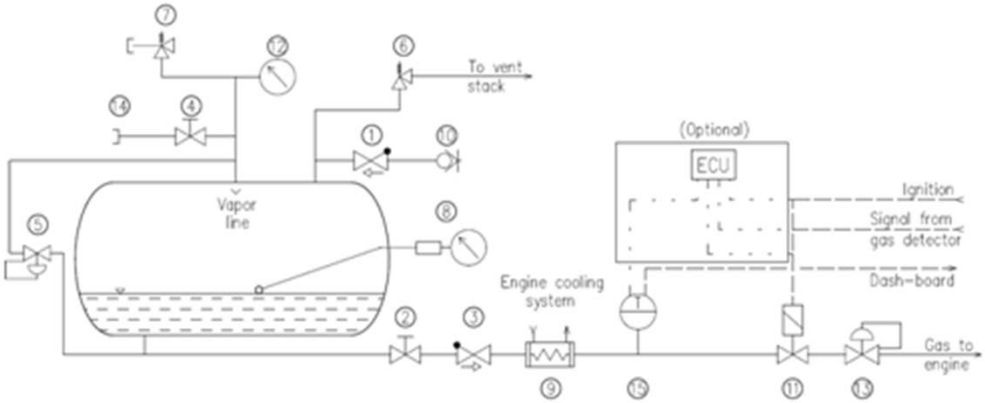
- **Bonfire Tests**
  - **ECE R110 / R67**
    - At 590 °C until full release / burst
    - PRD (temp) vs. PRV (press)
  - **CGA C-14**
    - At 649 °C; partial release within 10 min & complete release within 20 min
  - **SAE J2343**
    - At 538 °C below RVP for 20 min
  - **ISO 12991**
    - At 590 °C hold-time > 5 min

What components do we need to add for LNG, and what do we call CNG?

Annex A
(informative)

Construction and assembly

Figure A.1 — LNG fuelling system



1 Fill check valve
2 Fuel shutoff valve
3 Excess flow valve
4 Vapor shutoff valve
5 Pressure control regulator
6 Primary relief valve (PRV)
7 Secondary relief valve (PRV)
8 Fuel contents gauge
9 Heat exchanger – vaporizer
10 Fill fitting
11 Automatic fuel shutoff valve
12 Tank pressure gauge
13 Overpressure regulator
14 Vent connector
15 Gas temperature sensor
ECU Electronic control unit of engine

LNG components

- **LNG tank**
  - R110 CNG as basis
  - ISO12991(Liquefied natural gas (LNG) — Transportable tanks for use on board vehicles
  - EN1251 (Transportable vacuum insulated vessels of not more than 1000 litres volume)
  - NFPA 57 2-3.5 (Liquefied Natural Gas (LNG) Vehicular Fuel Systems Code) (hold time 120 hour)
- **LNG pump**
  - New systems / ideas need to be included where possible
- **LNG receptacle**
  - Basic safety properties
  - No definition about design (this is up to ISO12617(Road vehicles — Liquefied natural gas (LNG) fuelling connector 3.1 MPa connector))

Components included in the new annexes:

- ECU for CNG/LNG applications
- LNG heat exchanger vaporizer
- LNG pressure control regulator
- LNG pressure / temperature sensor
- Natural gas detector
- Automatic valve, check valve, pressure relief valve, excess flow valve, manual valve and non-return valve for LNG applications

New tests required for new LNG components

- LNG - low temperature test (below -40°C)
- Compatibility with heat exchange fluids of non metallic parts

Coming soon…….

Important sites:

- http://www.unece.org/trans/main/wp29/wp29regs.html
- http://eur-lex.europa.eu/en/tools/sitemap.htm
- http://www.kiwa-expertcentres.com/expertcentres/eup/yourproducts/automotive-products-components.aspx

Thanks for your attention

If you do have any questions please let me know