Some issues on Dual-fuel for GFV-10 meeting 8 June 2010
Submitted by Volvo & TNO

GRPE guidance needed for work priorities and work process

- Huge number of issues for GFV. Major technology differences between HD (Diesel – gas) and LD (several DF emerging technologies, incl. gasoline – gas) vehicles. Would a separate Task-Force for HD-DF be a solution?
- Follow-up of section (17) of GFV-09-02 report : "A fundamental decision must be made if certification requirements will be recommended in Reg.49, aimed at OEMs."
- validation of section (23): Approaching OEM and retrofit simultaneously could save time. Amendments for regulation 49 (HDV) are needed for drafting an amendment in R.115 (concerning the emission test procedures to R49).
- Is it OK that new R49 rules be as harmonized as possible with other rules already existing or under elaboration throughout the world?
  Work-priority could then be given to the already regulated dual-fuel technologies in order to facilitate their early introduction ("Low hanging fruits")

Types of HD-DF (Diesel – gas)

- DF Type 1 engines: Diesel / gas Dual-fuel engines with a very high level of gas usage, for example the CAL "HD pilot ignition engines"
- DF Type 2 engines: Diesel / gas Dual-fuel engines with a balanced usage of Diesel fuel
- DF Type 3 engines: Diesel / gas Dual-fuel engines with a very low level of gas usage
- The split between the types needs further work (e.g. 10% diesel for Type1 in CAL)

Basic principles to be respected

- Dual-fuel (Diesel /gas) engines capable of running with pure Diesel-fuel should comply with all the Diesel-fuel requirements.
  However a limp-home operation in a pure Diesel mode should be considered as an exception to this rule, but mobility restriction should apply (e.g. vehicle speed limitation).
- DF type1 engines should be considered as PI mono-fuel gas engines (they may be considered like in the USA as pilot ignited engines). Note: PN and NH3 to be addressed in the proper manner.
- DF type3 engines (e.g. less than 10% gas usage) should be considered as diesel-fuelled engines (in order to ensure sufficient robustness to the Regulation by avoiding "pseudo" Dual-fuels engines)
- DF type 2 engines should comply with the all the requirements applicable to Diesel mono-fuelled
  engines and to all the requirements applicable to mono-fuelled gas engines in a manner that is proportionate to the actual usage of respectively Diesel fuel and gas.
  This concerns emissions on the engine test-bed during certification and on the road in applying the PEMS method.
  This also concerns CoP requirements, Durability requirements, OBD, NOx control requirements, CO2 and FC recording. These requirements will need however more careful investigation regarding the proportionate principle.

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