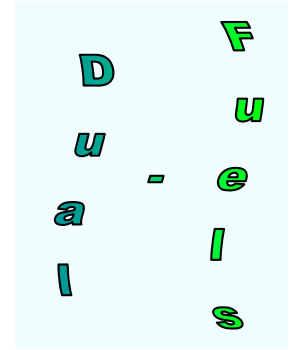


HDDF-TF status report to GFV

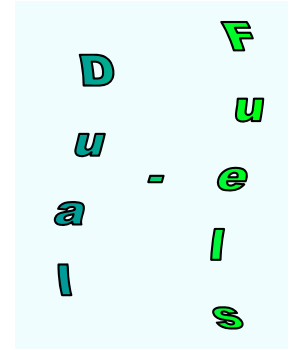
GFV meeting 27 Sept 2011

Meetings



- 11 July - plenary + outcome of GRPE
- 06 September - editorial
- 26 September – plenary + editorial
- 10 October – plenary + Calculation formulae
- 14 November – plenary + natural gas specific
- 14 December – plenary + editorial EURO V
- 09 January 2012 - plenary

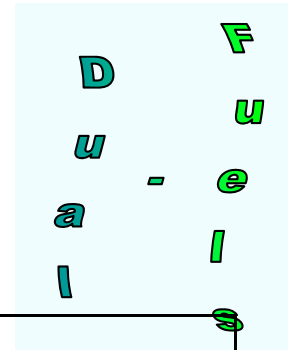
Documents and content



- 2 new annexes will be created
 - Annex 15 in R49 rev 6 (EURO VI)
 - Annex 11 in R49 rev 5 (EURO V and EEV)
- Annex 15 (status)
 - Definitions (incl. HDDDF types) – OK
 - Detailed Engine type requirements – OK
 - Performance requirements – 80% OK
 - OBD and NO_x control - OK

Note: some refinements may be introduced in the course of the next meetings

EURO VI - HDDF types (summary)



	average GER over WHTC ^[1]	idle on diesel	warm-up on diesel	operation on diesel solely	service-mode	comments
Type 1A	GER ≥ 90%	NOT Allowed	Allowed	NOT Allowed	Allowed	
Type 1B	GER ≥ 90%	Allowed only on Diesel mode	Allowed only on Diesel mode	Allowed only on Diesel mode	Allowed ^[2]	
Type 2A	10% < GER < 90%	Allowed	Allowed	NOT Allowed	Allowed	GER ≥ 90% allowed ^[3]
Type 2B	10% < GER < 90%	Allowed	Allowed only on Diesel mode	Allowed only on Diesel mode	Allowed ⁵	GER ≥ 90% allowed ^[4]
Type 3A	NEITHER DEFINED NOR ALLOWED					
Type 3B	GER ≤ 10%	Allowed	Allowed only on Diesel mode	Allowed only on Diesel mode	Allowed ⁵	

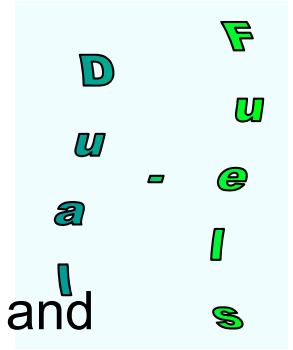
^[1] This average Gas Energy Ratio (GER) is calculated over the hot part of the WHTC test-cycle

^[2] Automatic switch-over to diesel mode allowed

^[3] idling exclusively on diesel fuel

^[4] idling exclusively on diesel fuel in dual-fuel mode

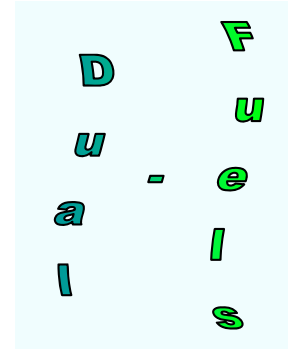
Marking



- The EURO VI gas marking principle shall be kept unchanged and extended
 - For CNG the H, L, HL marking, depending of the range of possible gases
 - For LNG a new M marking (M like "methane")
 - For LPG a new Q marking

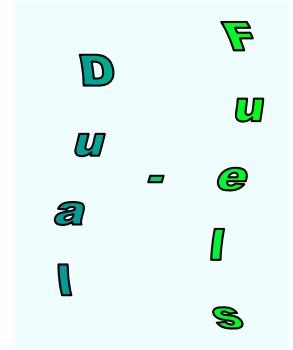
Note: The t subscript (e.g. HL_t) that stays for "transformable" may not be considered pertinent for HDDF. Will be confirmed in HDDF10 (Oct.2011).
- In addition it was agreed that one should identify a DF through its type, with 2 characters before the gas marking, resulting in, e.g.
 - 2BHL for CNG Type 2B HDDF, using a gas of the H or L range
 - 1AM for LNG Type 1A HDDF
 - 3BQ for LPG Type 3B HDDF

HDDF engine family



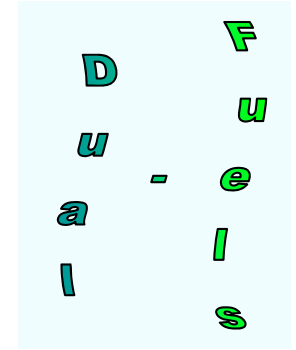
- All engines within a dual-fuel engine family shall
 - meet the criteria defined by this Regulation for belonging to a compression ignition engine family.
 - belong to the same type of dual-fuel engines (e.g. Type 2B, Type 1A, etc...)
 - operate with the same types of fuel or when appropriate with fuels declared according to this Regulation as being of the same range(s).
 - Remain within a GER_{WHTC} range that shall not exceed 30%
- In case of LPG engines, a HDDF Type 2B might be allowed to be included into a type 3B family, provided it complies with the type 3B requirements - To be worked out in the 10 October meeting.

PEMS test at type-Approval



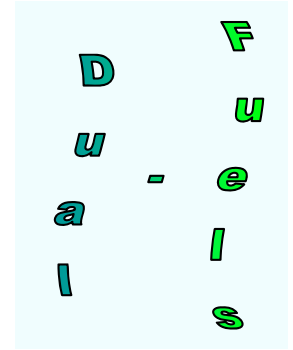
- The procedure specified for monofuel shall apply
 - Including the conformity factor
- The test shall be performed successively in diesel mode and dual-fuel mode
 - both tests need to be OK
- The Emission limits to be considered shall be those specified for the HDDF emission test

Installation requirements



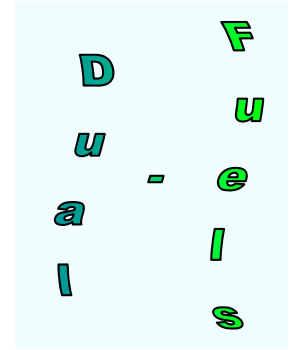
- Specific installation requirements will have to be satisfied for type-approving a vehicle equipped with an approved engine. They will include
 - The need for an appropriate Documentation package derived from that of OBD annex
 - Specifications similar to those set in Appendix 1 of Annex 9B
 - Demonstration requirements related to the service mode

Miscellaneous



- NTE lab test
 - shall be performed in both modes (when applicable)
- Durability
 - Noting specific to HDDF
 - No specific paragraph.
- CO2 and FC
 - may have to be reported in both modes (when applicable)
Will be documented in HDDF11 (November)
 - At this stage Annex 15 will not be applicable to the small mono-fuel LCVs (those the CO2 emission of which must comply with R101 - Chassis dyno test).
 - Annex 15 will become applicable to those vehicles only when R101 will also consider the case of DF engines.

Proposal for GFV decision



- Non HDDF specific items have been identified
 - ETC/WHTC correlation for HC for NG engines. **Data needed**
 - PN_{WHTC} (PI) **CVD data requested**
 - LNG "blow-off": GHG effects + measures
 - Much more linked with the vehicle and its usage than with the engine. Extremely difficult to regulate.
 - Safety will give a first limit.
 - Harmonisation with US/CAL regs ?
 - Could be addressed more in depth in a second stage when experience of LNG vehicles could be gathered so as to design a representative certification procedure.
 - Introduction of LNG into R49 (single fuel type-approval)
- 2 options left to GFV decision:
 - A new dedicated TF could be created
 - HDDF-TF or GFV would deal with these issues in dedicated meetings