GFV Task Force
Heavy Duty Dual Fuel vehicles
(HDDF TF)

GRPE 62 – 10 June 2011

GRPE informal document 21
suggested HDDF terminology

"HDDF i X"

• Digit i: category of HDDF, depending on the gas ratio
  – 1 for GR > 90%
  – 2 for 10% < GR < 90%
  – 3 for GR < 10%

• Character X: possible operating modes in the category
  – A for engines operating solely in Dual Fuel mode
  – B for engines capable of operating either in Dual Fuel or in Diesel mode
Definition issues

- GFV proposes the following definitions
  - "Dual-Fuel engine" means an engine that uses simultaneously 2 different types of fuels supplied from separate storage systems and where the consumed amount of one of the fuels versus the other one may vary depending on the operation.
  - "Dual-Fuel vehicle" means a vehicle that is powered by a Dual-Fuel engine and that supplies the fuels used by the engine from separate on-board storage systems.

- GFV recommends these definitions be included in the core text of Regulation 49, not in the Dual-fuel annexes and be limited to Diesel-gas HDDF

Does GRPE agree with GFV recommendation.?
Amendments to R85
(informal document GRPE62-17)

• Principles
  – The declared power and torque are those obtained in the Dual Fuel mode when the Diesel mode is also possible
  – Same reference fuels as the ones for the emission test
  – One the amendment affects all engines, not solely HDDF
    o 5.2.1 reads currently
      "5.2.1. The net power test shall consist of a run at full throttle for positive-ignition engines and at fixed full-load fuel injection pump setting for diesel engines, the engine being equipped as specified in Table 1 of Annex 5 to this Regulation."
    o 5.2.1 shall be amended to read
      "5.2.1. The net power test shall consist of a run at full-load, the engine being equipped as specified in Table 1 of Annex 5 to this Regulation."

• Because the HDDF definitions shall be common, the formal amendments will be submitted together with the HDDF Annexes in R49 for GRPE approval in June 2012
EURO V and EURO VI
major points of progress since GRPE61

• HDDF indicators
  – An HDDF mode indicator will indicate the actual operating mode: Dual Fuel, service, or, when appropriate Diesel mode
    o "Service mode" indication will be given as soon as the service mode is activated
    o "Dual fuel" and "Diesel mode" indication may not be a steady indication but will last at least 1 minute
  – An Empty gas tank warning indicator will indicate the gas tank will soon become empty

• ISC
  – ISC tests shall be performed in the Dual Fuel mode according to the applicable existing EURO V or EURO VI processes for Diesel engines
  – When a Diesel mode is also possible
    o the tests will be also performed in the pure Diesel mode on the same engine.
    o Pass would mean pass both in Diesel mode and in DF mode
EURO VI
major points of progress since GRPE61

• NOx control measures
  – EURO VI NOx control measures shall apply "mutatis mutandis" to HDDF engines

• OBD
  – EURO VI HDDF shall be subject to full EURO VI OBD applicable to compression ignition engines
  – Gas supply system shall be subject to component monitoring

• PEMS test at certification
  – Will be performed on the dual fuel mode according to Annex VI
  – When a Diesel mode is available
    o Will also be performed on the Diesel mode
    o Pass conclusion if both the PEMS test on DF mode and the PEMS test on Diesel modes have concluded to pass
EURO VI - Lack of gas availability

• An operability restriction is activated as soon as a lack of gas supply is detected
  – This restriction is the same as the "severe inducement" specified in EURO VI Annex XIII (i.e. 20km/h)
  – If a Diesel mode is available, possibility to switch to the Diesel mode

• The restriction becomes active
  – in case of a malfunction of the gas supply system either 30 minutes after activation or after the next time the vehicle is stationary, whatever the earliest
  – in case of an empty tank immediately (the driver has been warned)
Draft time-plan – on time except for R115

- Aug – Dec 2010: principles - done
- GRPE Jan 2011: status report + informal document - done
- Jan – June 2011: draft requirements – done @ 80%
- GRPE June 2011: status report (incl. EURO VI HDDF rules) + amendments to R85 (informal document)
- July – Dec 2011: amendments to UNECE-R49
- GRPE Jan 2012: informal HDDF annexes. + guidance Re Retrofit
- Jan - Mar 2012: HDDF annexes
- GRPE June 2012: approval of the amendments to UNECE-R49
- WP29 Nov 2012: approval of the amendments to UNECE-R49

difficulties regarding amendments to R115
DELAY necessary!