

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

GRPE 62 – 10 June 2011

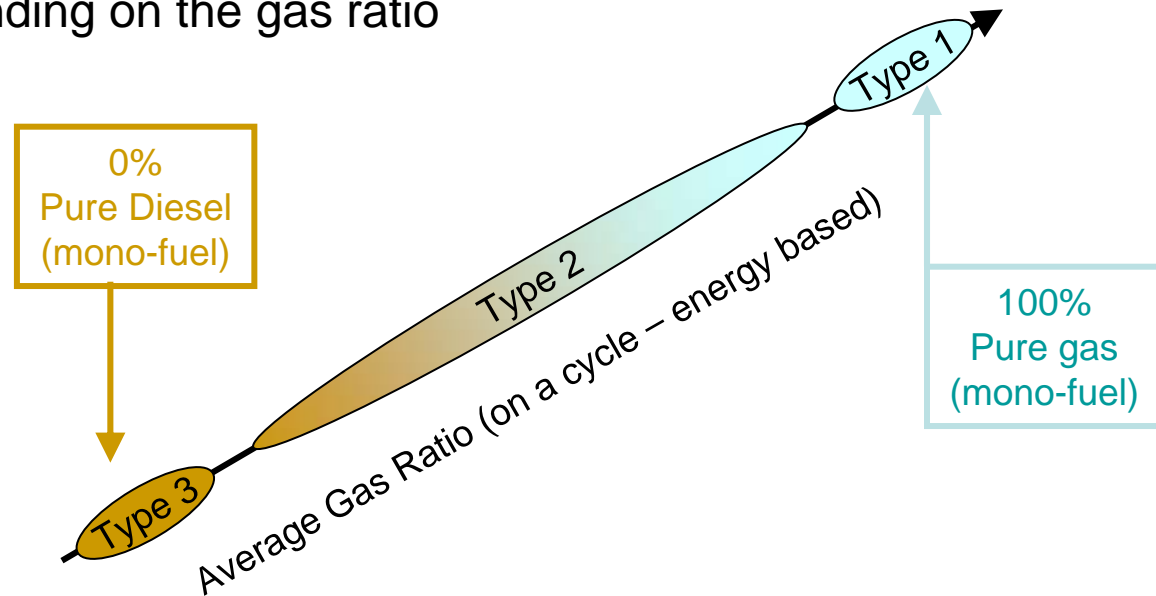
GRPE informal document 21

suggested HDDDF terminology

"HDDDF i X"

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- Digit i:
category of HDDDF, 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

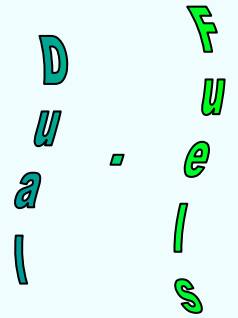
Definition issues

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- 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

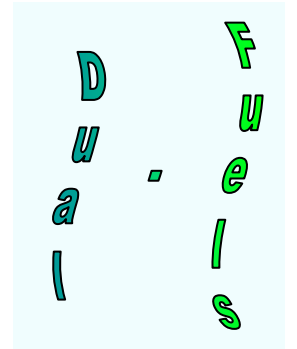
Does GRPE agree with GFV recommendation. ?

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 HDDDF
 - 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."
 - 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 HDDDF definitions shall be common, the formal amendments will be submitted together with the HDDDF Annexes in R49 for GRPE approval in June 2012

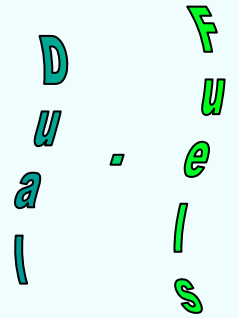
EURO V and EURO VI major points of progress since GRPE61



- HDDF indicators
 - An HDDF mode indicator will indicate the actual operating mode: Dual Fuel, service, or, when appropriate Diesel mode
 - "Service mode" indication will be given as soon as the service mode is activated
 - "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
 - the tests will be also performed in the pure Diesel mode on the same engine.
 - 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
 - Will also be performed on the Diesel mode
 - Pass conclusion if both the PEMS test on DF mode and the PEMS test on Diesel modes have concluded to pass

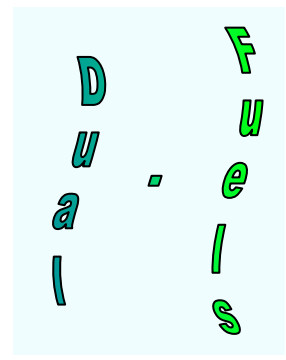
EURO VI - Lack of gas availability

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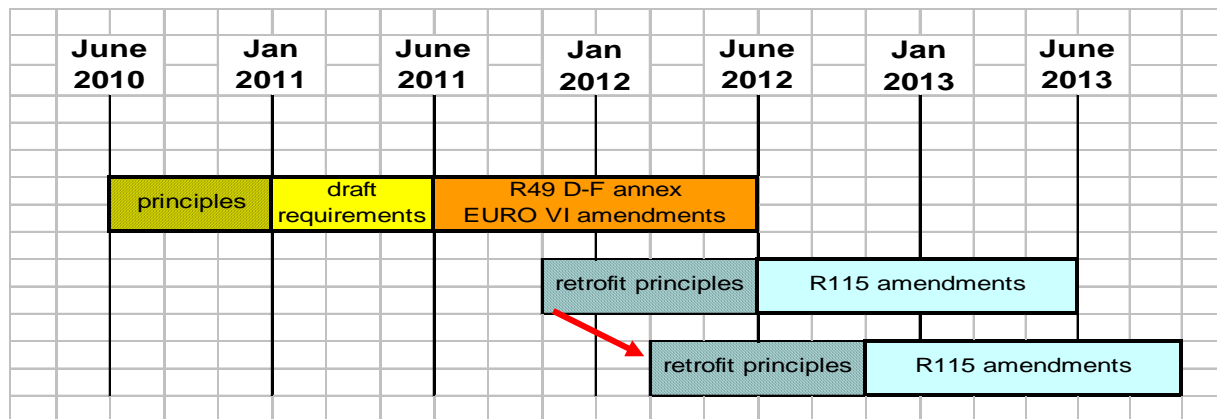
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- An operability restriction is activated as soon as a lack of gas supply is detected
 - This restriction is the same as the "severe inducement" specified in EURO VI Annex XIII (i.e. 20km/h)
 - If a Diesel mode is available, possibility to switch to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