

Informal document No. GRPE-61-25
(61st GRPE, 11-14 January 2011, agenda item 6(b))

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Heavy-Duty Dual Fuel (Diesel-gas) Regulation brief status report January 2011

GRPE

Geneva 13 January 2011

Full report (informal document GFV/12/03)
available at the following address:

<http://www.unece.org/trans/doc/2011/wp29grpe/GFV-12-03e.pdf>

Priorities (based on Commission desires)

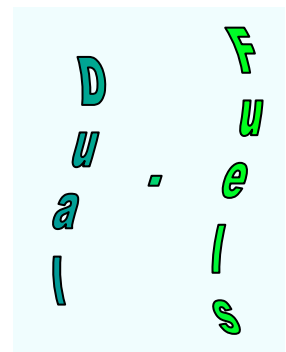
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- *The main focus for the TF is new vehicles*
 - *Highest priority is to adapt the Euro VI legislation.*
 - *Second highest priority is to adapt the Euro V and EEV legislations.*

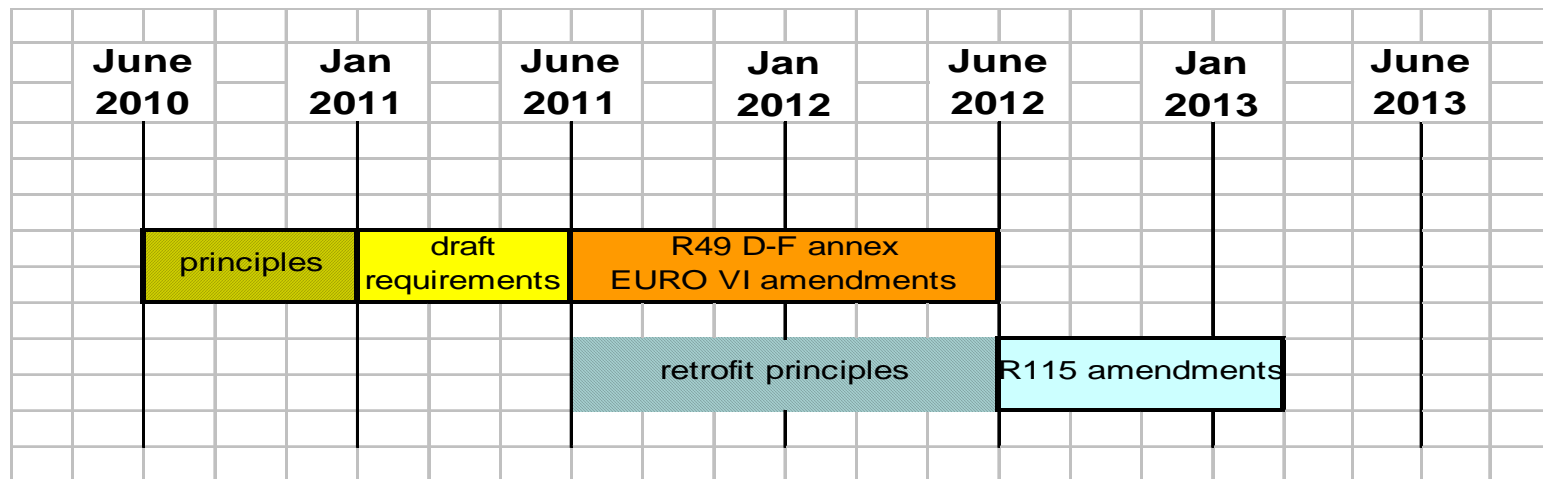
→ 2 New annexes 11a and 11b in R49

- *The adaptation of the R115 (retrofit) legislation shall be done in a second stage and be based on the requirements for new vehicles (R49).*
- *Amendments to R85 – and possibly R24, R67 and R110 (to be checked) are required*

Draft time-plan

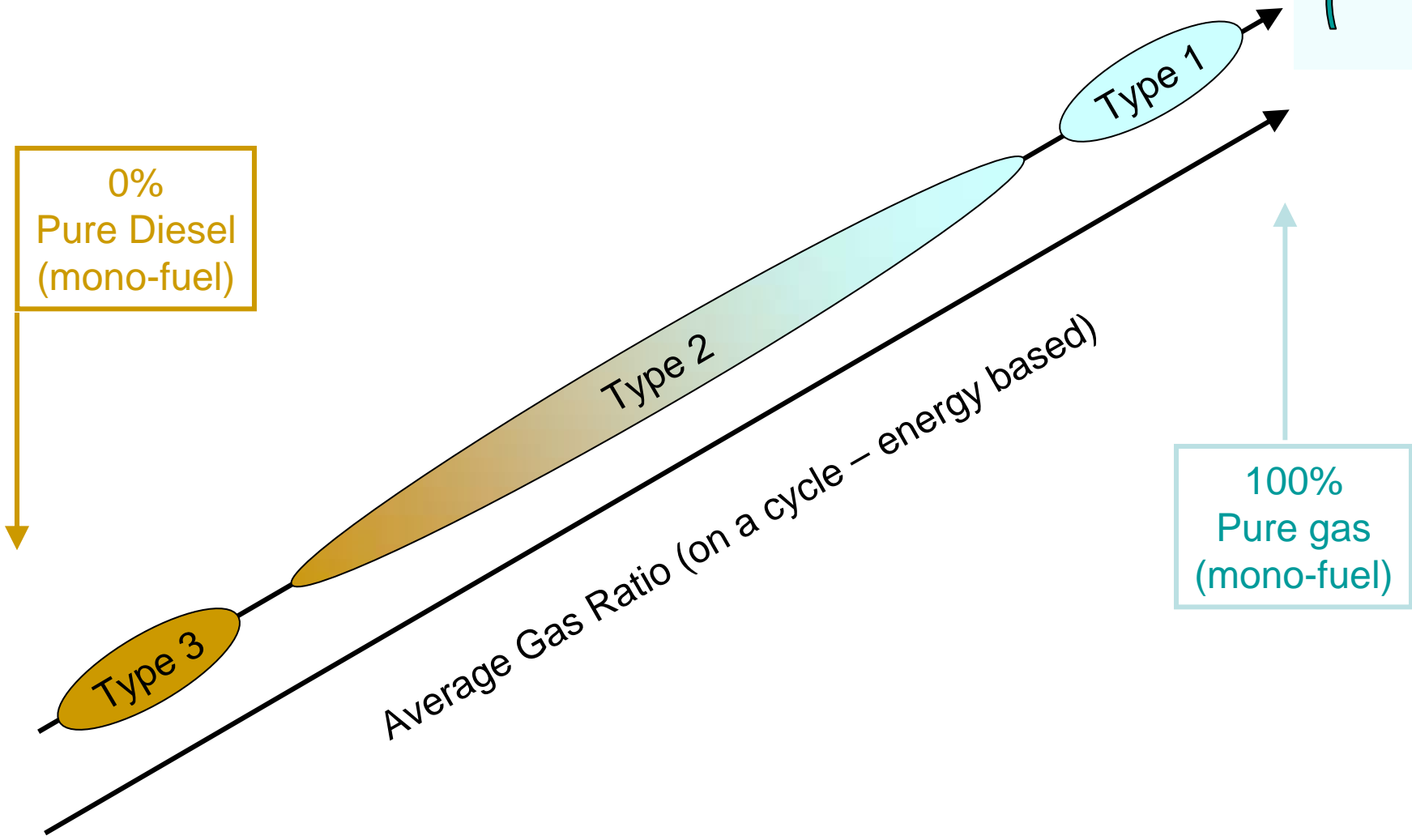


- Aug – Dec 2010: principles - done
- GRPE Jan 2011: status report + informal document
- Jan – June 2011: draft requirements
- GRPE June 2011: status report + informal document + guidance Re Retrofit
- July – Dec 2011: amendments to UNECE-R49
- GRPE Jan 2012: informal HDDF annexes.
- Jan - Mar 2012: HDDF annexes
- GRPE June 2012: approval of the amendments to UNECE-R49
- WP29 Nov 2012: approval of the amendments to UNECE-R49



The 3 Types of HD-Dual Fuel engines

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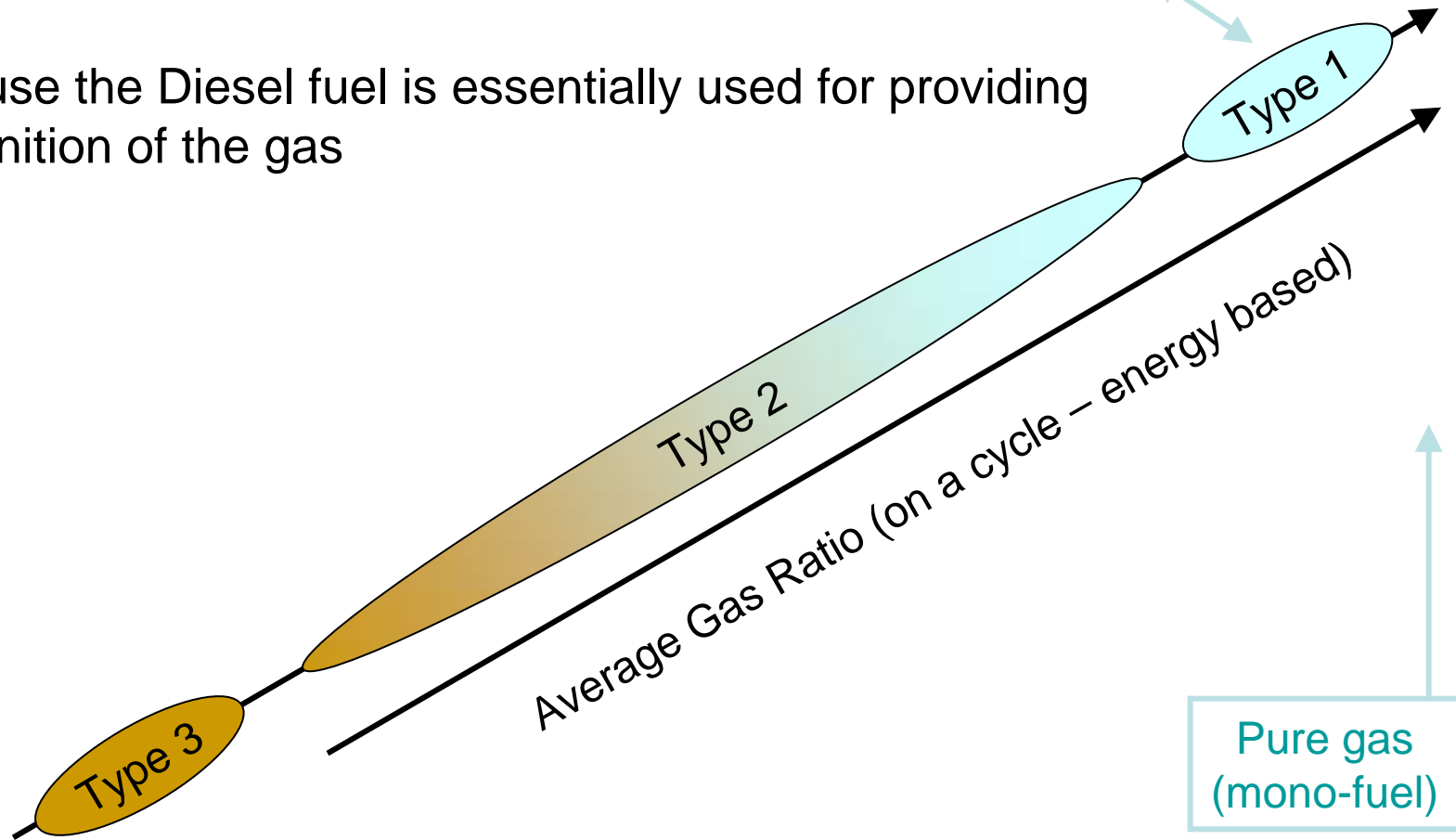


HDDF Type1 – limits and tests - principle

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A Type 1 HDDF will be regarded as a positive ignition engine

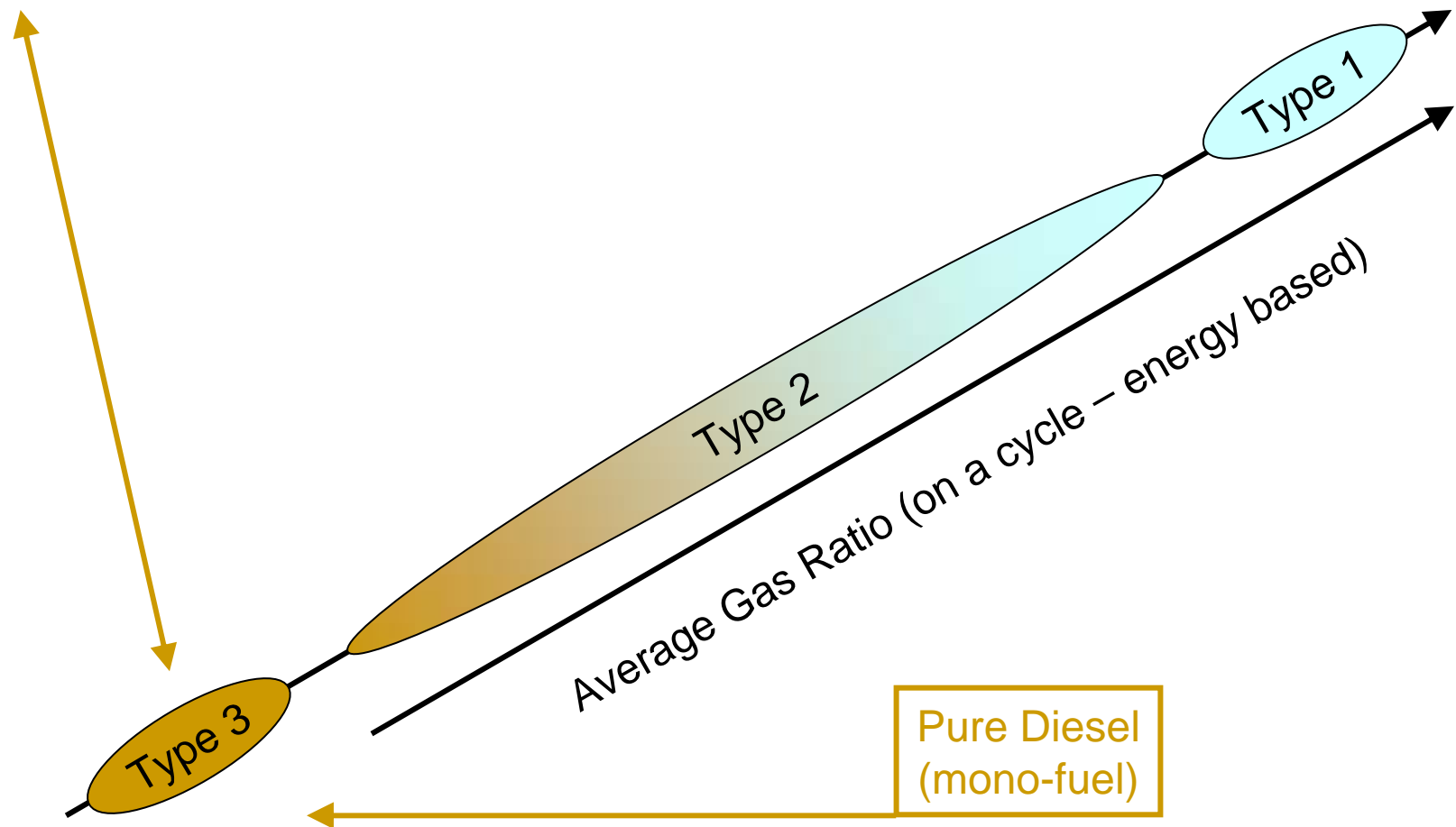
because the Diesel fuel is essentially used for providing the ignition of the gas



HDDF Type3 – limits and tests - principle

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A Type 3 HDDF will be assimilated to a Diesel mono-fuel engine.



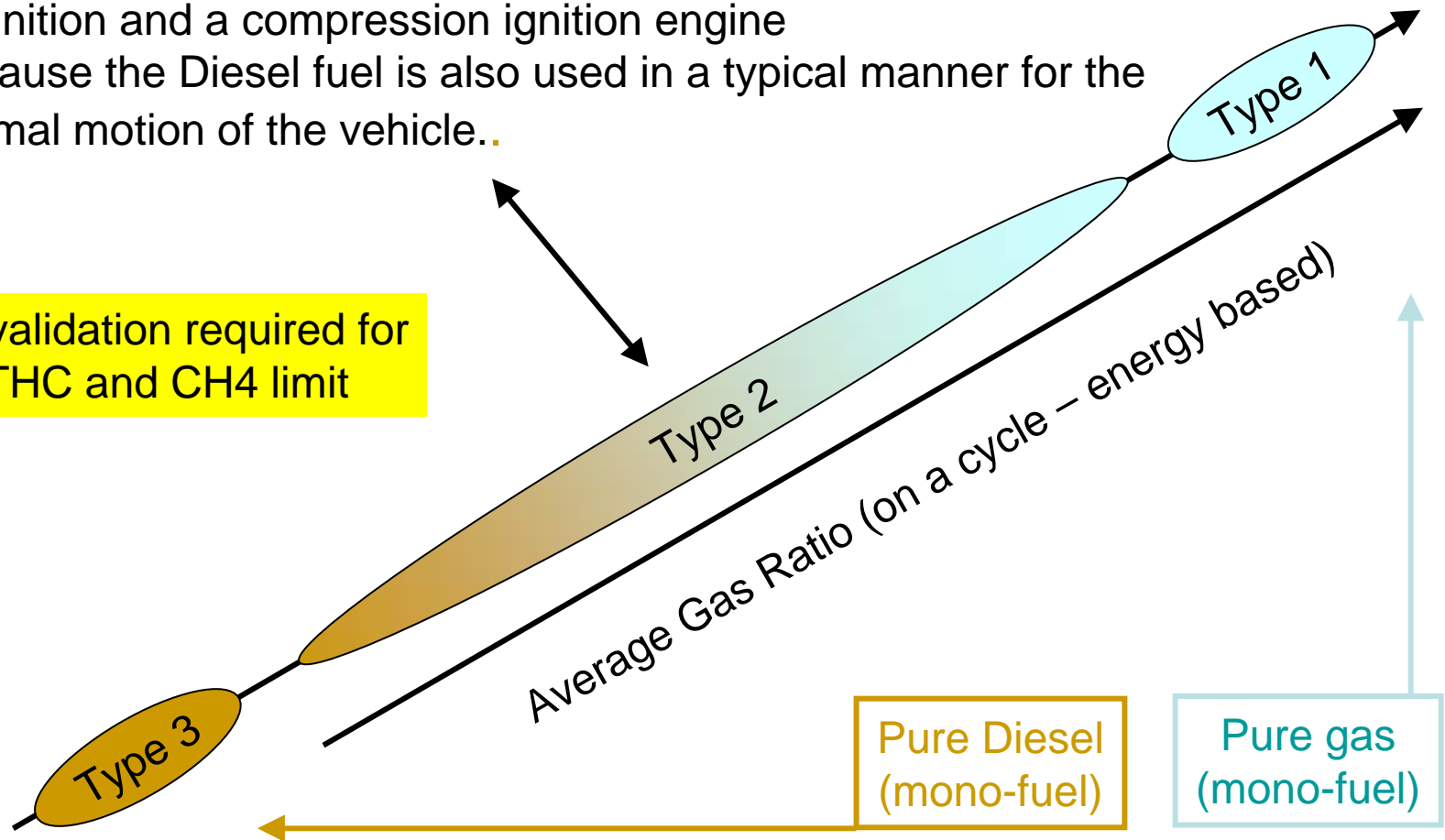
HDDF Type2 – limits and tests - principle

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A Type 2 HDDF engine will be regarded as an intermediate between a positive ignition and a compression ignition engine

- because the Diesel fuel is also used in a typical manner for the normal motion of the vehicle..

GRPE validation required for the THC and CH4 limit



Type 2 – GFV agreement regarding HC limits (principle)

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- Issue (question submitted to GFV)
 - One of the Dual Fuel possible advantages is to have lower CO2 emission
 - Would it be therefore possible not to apply or to relax CH4 (and THC) limits for Type2 HDDF ?
- GFV agreement
 - GFV agreed that Type2 HDDF will be subject at this stage to THC and CH4 limits because
 - The given argument could also apply to pure gas engines
 - Excluding CH4 from the regulated pollutants would be an important political decision outside of the mandate given to GFV
 - GFV agreed to reconsider in the future this position in the case where CH4 will be considered in a HD regulation as a green house gas and not as a gaseous pollutant

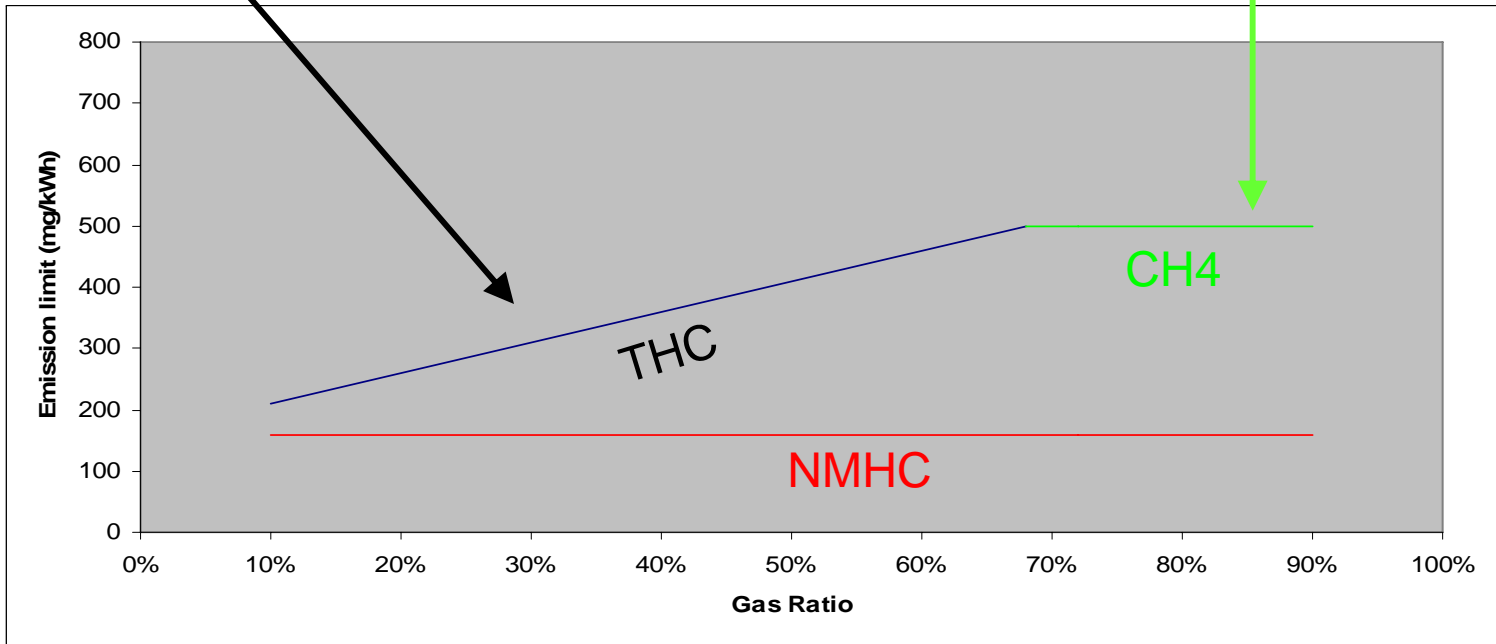
It is requested from GRPE to formally validate the GFV decision

Type 2 – GFV agreement regarding HC limits (transient test cycles)

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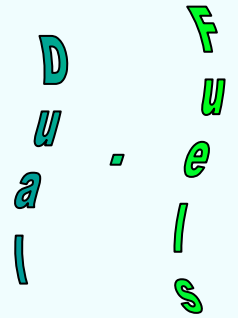
The applicable THC limit shall be proportionate to the Gas ratio (averaged on a cycle - energy based)

The CH4 emissions of an HDDF Type 2 engine shall never exceed the CH4 limit applicable to gas engines



It is requested from GRPE to formally validate the GFV decision

HDDF engines – Pure Diesel operation mode



- A HDDF engine that can run with only Diesel fuel all through a normal vehicle operation shall be considered as a Type 2+ HDDF
 - Complying with the Type 2 HDDF rules when powered with Diesel and Gas
 - Complying with the pure Diesel rules when powered with pure Diesel
- Type1 or Type2 HDDF engine may also have a "limp-home strategy" where the engine is powered with only Diesel fuel (e.g. to cope with empty gas tank).
GFV agreed on the following rules for such a limp-home strategy:
 - A 2-step mobility restriction is introduced at respectively 70 and 20 km/h
 - The 20km/h restriction is introduced after 8hrs at 70km/h (Type 2)
 - Rules of Annex XIII will be adapted (EURO VI engines)
 - Warning will be introduced as well as MI illumination and OBD fault recording

HDDF fuels - LNG and bio-methane

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- There is a trend to use LNG and/or Liquefied bio-methane for HDDF engines.
- GFV agreed
 - to introduce G20 (high caloric reference gas) into the reference fuels list in accordance with the LDV Regulation (EC) 692/2008
 - to introduce the possibility of having a "single" gas-fuel type-approval mechanism introduced that would not require a double testing (e.g. with G20 and G23)
 - Pending the Commission decision, this feature may be part of the EURO VI Comitology package 2

It is requested from GRPE to formally validate the GFV decision

Conclusion – Requests to GRPE

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GRPE is requested to validate the GFV agreements, and specially

- The proposed time-plan / road-map
- The proposed approach concerning the way to address CH₄ and THC for Type 2 HDDF engines and vehicles
- The proposed way to address LNG fuelled HDDF engines and vehicles