

EUROMOT POSITION

20 May 2015



EU LCP BREF – Feedback on Gaseous Fuel (Lean Burn) Engines

With a view to the forthcoming discussion at the final TWG meeting in Seville in June 2015, the member companies of EUROMOT want to raise the following concerns on the proposed Chapter 10 "Best Available Techniques (BAT) Conclusions for Large Combustion Plants":¹

10.4.1 BAT 44 - Energy Efficiency, Table 10.26:

Current text of the LCP BREF PB Document:

Table 10.26: BAT-associated ~~environmental performance~~ energy efficiency levels (BAT-AEELs) for the energy efficiency of the combustion of natural gas fired combustion plants

Type of combustion plant	BAT-AEELs for energy efficiency (yearly average) ⁽¹⁾				
	Net electrical efficiency (%) ⁽¹⁾		Net total fuel utilisation (%) ⁽¹⁾ ⁽¹⁾	Net mechanical energy efficiency (%) ⁽¹⁾	
	New plants	Existing plants		New plant	Existing plant
Gas engine					
Gas engine ⁽²⁾	42–46.5 to above 46.5	35–44	56–85	NA	NA
CHP gas engines ⁽³⁾	-	-	56–78	-	-

¹ Document TL/JFF/EIPPCB/Revised LCP_Draft of 1 April 2015

Proposal for modification:

- Change efficiency for net electricity efficiency new engine to 40 .. 44 %
- Change total fuel utilization to “brutto”.
- Add text to table:
 - a. Efficiency is design efficiency at MCR, ISO 3046-I conditions
 - b. Natural Gas with Methane Number > 80, poorer gas quality affects detrimentally efficiency
 - c. Typical own consumption range is case specific around 2.2 % of produced power depending on plant configuration (no secondary emission abatement technologies installed, etc.)
 - d. CHP efficiency depends on heat recovery need at site and exergy of the heat needed.

Justification: See source /4/ “Natural gas combustion in gas engines efficiency” document.

10.4.1 BAT 50 – CH₄, formaldehyde, Table 10.29:

Current text of the LCP BREF PB Document

Table 10.29: BAT-associated emission levels (BAT-AELs) for ~~NM/OC~~ formaldehyde and CH₄ emissions to air from the combustion of natural gas in an ~~SG or DF~~ engines

Pollutant	BAT-AELs (mg/Nm ³)	Monitoring frequency
	Average over the sampling period of samples obtained during one year	
NM/OC Formaldehyde	4-40 2-15	Periodic measurements: 4 times/yr
CH ₄	200-400 185-500 (*)	Periodic measurements: 4 times/yr

(*) This BAT-AEL applies only to an SG-type engine and is expressed as C at maximum continuous rating (MCR)

The associated monitoring is in BAT 3 ter.

Proposal for modification:

- New engines:
 - SG-type engine: CH₄*: 283 ... 500 mg/Nm³ (15 % O₂) calc. as C at engine MCR, (*lower range has been measured in 2-stroke SG engines)
 - Formaldehyde: 10 ... 15 mg/Nm³ (15 % O₂)
- Existing engines:
 - SG-type engine: CH₄: < 800 mg/Nm³ (15 % O₂) calc. as C at engine MCR
 - Formaldehyde: 10 ... 23 mg/Nm³ (15 % O₂)

Justification:

Methane slip limit for an existing SG-type engine is missing. In source /15/ we proposed a higher limit for existing SG type gas engines such as 560 mg/Nm³ (15 % O₂) with efficiency correction from 30 % electrical energy upwards/downwards. In light of the performed Danish field tests a higher CH₄ limit is needed than proposed one for existing engines.

Proposed lower methane slip table limit in the span is not found in BATIS (reference 166 (2 stroke SG-type) no CH₄ data reported). No. 186 (SG-type) CH₄ data is based on only one sample and is thus not reliable /15/, reference plant 40 (SG-type) did not report any methane value. No. 353 (2-stroke SG) and 354 (2-stroke SG) reported 283 respectively 477 mg/Nm³ (15 % O₂) CH₄-emissions, EUROMOT raised doubts about the correctness of the low measured CH₄ emissions (for references 353 and 354) in e-mail /17/. Thus a note “Lower range measured in 2-stroke SG-type engines” to be marked in context with the values from (references 353, 354) if used.

Justification for formaldehyde:

Lower threshold: Danish Gas Technology Center study /16/ concluded in the summary an emission target of 20 mg/Nm³ (5 % O₂) at 30 % electrical energy (scale up/downwards): i.e. a gas engine with a 44 % electrical energy limit should be about 11 mg/Nm³ (15 % O₂) formaldehyde calc. as C.

The Danish report is rather optimistic in its´ summary emission target, because on page 40 is stated “... *It is expected that a large fraction of the engine sites in the future will move to the liberalized power market. This will cause conditions for catalysts to change, increasing number of starts and stops. The change might influence the catalyst loss of efficiency and durability due to more thermal fluctuations putting more stress on the materials*”. Uncertainty is also clearly highlighted in the report e.g. on page 59: “*The only uncertainty in using the oxidation catalyst will be the long-term (above 12500 hours) performance, which remains to be proven*”. The lower span limit of 2 mg/Nm³ (15 % O₂) should be raised, typical performance values of formaldehyde catalyst should be used not fresh unused catalyst “theoretical” values. Existing engines should have a higher formaldehyde limit due to space restrictions in the plant.

We remain available for further clarifications and in-depth discussions of our positions.

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For more information please contact:

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Sources besides BATIS

- /1/ EPPSA/Eurelectric “Report of the Task-Force Energy Efficiency Large Combustion Plant BREF TWG”; submitted to BATIS December 2014
- /2/ EUROMOT Comments on “Report of the Task-Force Energy Efficiency -Large Combustion Plant BREF TWG”; submitted to BATIS January 2015 (also available at <http://www.euromot.eu/download/54da4bfeb49bf328fd49c7b8>)
- /3/ Euromot: “BAT Associated Energy Efficiency Levels” report submitted to BATIS September 2014 (also available at <http://www.euromot.eu/download/5453c772de27a3a6fea5ce05>) .
- /4/ Euromot feedback on LCP BREF Data Collection 2011 – 2012 submitted to BATIS 08.05-15.
- /5/ Comments on Maltese Plant Data Submitted by EEB (European Environmental Bureau) on 3 December 2014. Submitted to BATIS February 2015 also available at (<http://www.euromot.eu/download/54da4c2cb49b86c3cbe73ca9>) .
- /6/ “Euromot Position for the Gothenburgh Protocol”, submitted April 2012 to BATIS, also available at <http://www.euromot.eu/download/54383790de278fdb4d094c7>
- /7/ Euromot e-mail on 17th of May 2013 from P. Zepf to T.Lecomte at EIPPCB.
- /8/ Euromot Position : Draft D1 Large Combustion Plants BREF- BAT AELS for HFO fired Engines submitted to BATIS September 2013 (also available at <http://www.euromot.eu/download/54383683de278fdb4d093b1>)
- /9/ “Euromot Response to CEFIC Comments as of 17 July 2014”, submitted to BATIS December 2014, (available also at <http://www.euromot.eu/download/5478c1c83efeb631842bcb77>)
- /10/ LCP BREF D1
- /11/” Industrial Baghouse Filters: Filter Bags and Cartridges “ at link http://www.gore.com/en_xx/products/filtration/baghouse/filterbags/industrial-baghouse-filters-products.html
- /12/ https://www.google.fi/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=10&ved=0CFYQFjAJ&url=https%3A%2F%2Fcleanshippingcurrents.eu%2Ffojs%2Findex.php%2FCSCurr%2Farticle%2Fdownload%2F6%2F9&ei=XCNHVbq1NLGf7qaJqIH4CA&usq=AFQjCNEU6JS9_FpVHzoSK0QNUZRXCvbLUq see page 13.
- /13/ US EPA AP-42 at <http://www.epa.gov/ttn/chief/ap42/ch03/final/c03s04.pdf>
- /14/ <http://www.epa.gov/ttn/catc1/dir1/fcyclon.pdf>
- /15/ Euromot: Large Combustion Plant BREF D1 (Draft) – BAT AELs for Gas Engines, submitted September 2013 to BATIS, also available at <http://www.euromot.eu/download/54383688de278fdb4d093b6>

/16/ Danish gas Center report at
http://www.dgc.eu/sites/default/files/filarkiv/documents/R0703_formaldehyd_reduction.pdf .

/17/ Euromot e-mail on 25th of March 2013 from J.Boij to T.Lecomte at EIPPCB.

/18/ LCP BREF 2006

/19/ <http://www.Ingworldnews.com/wartsila-to-convert-maltese-power-station-to-run-on-gas/>

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