CIMAC

THE INTERNATIONAL COUNCIL ON COMBUSTION ENGINES

# WG 5 - Reports on Regulary Developments – Stationary Power Plants

Frankfurt / Germany

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# Abbrevations (1/2):

| | |
|---|---|
| BREF | Best available Reference Techniques Reference document |
| EMPR | European Metrology Reserach Programme |
| EU | European Union |
| ELV | Emission Limit Value |
| HFO | Heavy Fuel Oil |
| ISO | International Organisation for Standardisation |
| LCP | Large Combustion Plant |
| LFO | Light Fuel Oil |
| LNG | Liquified Natural Gas |
| MCPD | Medium Conmbustion Plant Directive |
| MIS | Micro Isolated System |
| MN | Methane Number |

# Abbrevations (2/2):

| | |
|---|---|
| MS | Member State |
| OTNOC | Other Than Normal Operating Conditions |
| SIS | Small Isolated System |
| SCR | Selective Catalytic Reduction |
| TC | Technical Committee |
| THC | Total HydrogenCarbon |
| VSL | Dutch National Metrology Institute |
| WG | Working Group |

# EU MCPD (Medium Combustion Plant Directive) 2015/2193

## ≥ 1 .... < 50 MWth plant

Reference point for engines 15 vol-% $O_2$

http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015L2193&from=EN

# Introduction

MCPD 2015/2193 (Annex I) published in the EU Official Journal 28.11 2015

EU Member States to transpose MCPD 2015/2193 into national law by 19.12 2017.
Status 12.11 2018, (http://eur-lex.europa.eu/legal-content/EN/NIM/?uri=uriserv:OJ.L_.2015.313.01.0001.01.ENG ) still pending in Germany.

"Review" Article 12:

1. By 1 January 2020, the Commission shall review progress in relation to the energy efficiency of medium combustion plants and assess the benefits of setting minimum energy efficiency standards in line with best available techniques.

2. By 1 January 2023, the Commission shall assess the need to review the provisions concerning plants which are part of SIS or MIS, as well as Part 2 of Annex II, on the basis of state-of-the-art technologies. See Annex I for "MCPD Annex II part 2" - new plant emission limits.

   As part of this review, the Commission shall also assess whether for certain or all types of medium combustion plants there is a need to regulate CO emissions.

# MCPD information exchange process (general) I

Ricardo nominated as consultant

Timeline:

| Step | MCP information exchange milestone | Actual / forecast dates |
|---|---|---|
| 1 | Activation of WG: EoI and decisions | January 2018 |
| 2 | Dissemination of background paper for KoM | February 2018 |
| 3 | Kick off Meeting of the WG | 6th March 2018 |
| 4 | Design of the questionnaires | March 2018 |
| 5 | Collection of information and data | Deadline August 2018 |
| 6 | First draft document | February 2019 |
| 7 | Final meeting | Q2 2019 |

# MCPD information exchange process (general) II

There are more than 140,000 MCPs. operating in the EU. This creates challenges for data collection.

Ricardo MCP categories proposals already leads to 54 categories (6 Fuels x 3 technologies x 3 sizes)

It should be ensured that these questionnaires also include plants which are part of SIS/MIS e.g. Spain, France and/or Portugal.

Sizes: 1 – 5, 5 – 20, 20 – 50 MWth

Fuels: Solid biomass, other Solid fuels, Gas oil, Liquid fuels other than gas oil, Natural gas, Gaseous fuels other than natural gas

Technology: Boilers, Gas Turbines, Engines

# MCPD information exchange process (general) III

Emission Species:

Emissions in focus: NOx, SOx, CO and dust

Other emissions such as

$NH_3$, $CH_4$, Hg. etc. will be considered *only if available and relevant*

"*The default reference year is 2017 (years 2014 –2016 are possible).*"

" *Ensure that contextual information is captured together with CO emissions: plant rates (production loads), NOx emissions and associated technologies*."

"*Ensure that questionnaires capture average operating hours per year and end use (e.g. backup power production in connected islands). Emission and energy efficiency will be meaningful if a plant is stable at normal operating conditions*."

"*Capture in questionnaire: hours per year (e.g. 0-500 hrs, 500-1500 hrs, >1500 hrs). No need to define emergency/back up supply*."

# MCPD information exchange process (general) IV

New MCP ELVs:

"*This MCP exchange should provide evidence to underpin any change of new MCP ELVs. Due to the definition for new plants (put into operation after 20 December 2018 or a permit was granted) emission levels should be derived from state-of-the-art plants recently commissioned*"

MIS/SIS:

" *This MCP information exchange will seek to identify and assess the specific technical features that may lead to a lower environmental performance* "

Efficieny:

" *There was an ad hoc subgroup on this topic during the LCP BREF review. Definitions and monitoring approach from LCP BREF can apply also to MCPs* "

# MCPD information exchange process actions

Ricardo sent out the "*MCP_Questionnaire*" (based on the previous LCP BREF made) and "*OTNOC&Technology template*" to WG in beginning of March 2018 for feedback by 30.04- 18.

Ricardo sent in March 2018 out template "*MCPplantsfillinQuestionnaire*" for gathering MCP plants to WG. WG should send this to "volunteer" plants" and plants to contact national focal point by 30.04-18 if interest to participate. Outcome (28.05 2018):

- 15 Other liquid fuel (HFO) fired engines (14 in SIS/MIS)
- 13 Gas Oil fired engines (5 in SIS/MIS)
- 32 natural gas fired engines: (19 in SIS/MIS)
- 16 biogas fired engines

Questionnaire (sent out via national focal point (NFP) to participating reference plants in end of May) to be filled in by plant operators by 15th August 2018 and sent to NFP. MS (Member State) will check obtained data and then forward it to Ricardo. See otcome Annex II.

Ricardo also asked WG to provide additional information on: regulations, ELVs, applicability restrictions of technologies, etc. by 15th August 2018. (Euromot document submission 14.08-18, Annex III).

# ISO/TC 193/WG 8 Knock Resistance (Methane Number (MN))

# ISO/TC 193/WG 8 Knock Resistance (Methane Number (MN)) 1/2

- Euromot involved via consultant participating under Italian CUNA mandate
- First meeting held 29th March 2018 (decision to compare ”MWM”, ”EMPR/ENG60 LNG II” (VSL) and ”DNV-GL” MN algorithm results using different gas compositions). Euromot submitted Position Paper ”Methane Number evaluation of the MWM and DNV-GL methods” in May 23rd to ISO group chair.
- Second meeting 24th May: Discussion about different reference gases (for comparison of methods: wide WI-range, extreme gases (e.g < 35 % ethane, > 34 % methane)), required accracy and ease of use of algorithms. Euromot consultant forwarded June 12. information on ”*number of the gas compositions that Euromot has used for comparing the different knock resistance determination methods*” in earlier projects to ISO group chair.
- The latest meeting was a telecom on July 3, 2018. Euromot had provided data on the composition of a number of natural gases supplied around in Europe. The required accuracy for the Methane Number was discussed.

# ISO/TC 193/WG 8 Knock Resistance (Methane Number (MN)) 2/2

- Latest meeting cont.:

Euromot consultant prepared on October 15. a paper and for consulting of the Euromot gas engine expert group. On November 6. the Euromot paper “Required accuracy of the Methane Number“ was submitted to ISO group chair.

The date of the next meeting is yet unknown.

- The ”MWM” MN method (included in CEN 16726) has recently become an (US) ASTM D8221-18 method !

# APPENDICES

# Annex I (1/2) New Plant (Engine & Gas Turbine emission Limits)

Emission limit values (mg/Nm³) for new engines and gas turbines

| Pollutant | Type of medium combustion plant | Gas oil | Liquid fuels other than gas oil | Natural gas | Gaseous fuels other than natural gas |
|---|---|---|---|---|---|
| $SO_2$ | Engines and gas turbines | — | 120 (1) | — | 15 (2) |
| $NO_x$ | Engines (3) (4) | 190 (5) | 190 (5) (6) | 95 (7) | 190 |
| | Gas turbines (8) | 75 | 75 (9) | 50 | 75 |
| Dust | Engines and gas turbines | — | 10 (10) (11) | — | — |

(1) Until 1 January 2025, 590 mg/Nm³ for diesel engines which are part of SIS or MIS.

# Annex I (2/2) New Plant (Engine & Gas Turbine emission Limits)

(2) 40 mg/Nm³ in the case of biogas.
(3) Engines running between 500 and 1 500 hours per year may be exempted from compliance with those emission limit values if they are applying primary measures to limit $NO_x$ emissions and meet the emission limit values set out in footnote (4).
(4) Until 1 January 2025 in SIS and MIS, 1 850 mg/Nm³ for dual fuel engines in liquid mode and 380 mg/Nm³ in gas mode; 1 300 mg/Nm³ for diesel engines with ≤ 1 200 rpm with a total rated thermal input less than or equal to 20 MW and 1 850 mg/Nm³ for diesel engines with a total rated thermal input greater than 20 MW; 750 mg/Nm³ for diesel engines with > 1 200 rpm.
(5) 225 mg/Nm³ for dual fuel engines in liquid mode.
(6) 225 mg/Nm³ for diesel engines with a total rated thermal input less than or equal to 20 MW with ≤ 1 200 rpm.
(7) 190 mg/Nm³ for dual fuel engines in gas mode.
(8) These emission limit values are only applicable above 70 % load.
(9) Until 1 January 2025, 550 mg/Nm³ for plants which are part of SIS or MIS.
(10) Until 1 January 2025, 75 mg/Nm³ for diesel engines which are part of SIS or MIS.
(11) 20 mg/Nm3 in the case of plants with a total rated thermal input equal to or greater than 1 MW and less than or equal to 5 MW.

# Annex II List of Countries submitting Recip. Engine Emission Data

- Greece (submittance 16.10 -18 !) LFO, HFO fired diesel engines (SIS/MIS)
- Spain: LFO, HFO fired diesel engines (SIS)
- Italy: LFO (MIS) LFO fired diesel engine, gas fired engines
- Germany: bio- and natural gas fired engines
- Hungary: gas fired engine
- Romania: gas fired engine
- Belgium: bio, natural gas fired engines
- Netherlands: natural gas fired engines
- Finland: LFO fired emergency engine (estimated emissions)

Note ! Some countries have provided data:SCR+SG gas engine, THC, formaldehyde emissions, etc.

# Annex III (1/2) MCPD information exchange Process – Euromot submitted information 14.08 -18

**The European Association of Internal Combustion Engine Manufacturers**

EUROMOT

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**Recommendations on Collecting and Evaluating Information on the Environmental Performance of Technologies used in Medium Combustion Plants (MCP) and Energy Efficiency**

**19 July 2018**

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EUROMOT, the European Association of Internal Combustion Engine Manufacturers, fully supports gathering information from Member States, plant operators and suppliers, aftertreatment equipment suppliers and other relevant stakeholders.
For that purpose, we would like (a) to make generic comments on MCP-specific issues raised by the respective worksheets of the questionnaire provided by Ricardo, and (b) strongly recommend the data evaluation process to be complemented by taking into account the extensive documentation and background information on engine and aftertreatment technologies and performance that was collected during the recent revision of the UNECE Gothenburg protocol and the review of the LCP BREF by the European Commission - Joint Research Centre.

**1. Comments on the questionnaire worksheets**

# Annex III (2/2) MCPD information exchange Process – Euromot submitted information 14.08 -18

**2. Recommendation to review further reference and background material**

To enhance the amount of credible and verified information on the characteristics and performance of technologies as well as the technical and economic feasibility of internal combustion engines in stationary applications, EUROMOT would like to encourage reviewing the extensive amount of material created during the following recent regulatory processes:

- the revision of the UNECE Gothenburg Protocol;[2] and
- the review of BAT within the context of the EU Industrial Emissions Directive (LCP BREF).[3]

In the Annex on the following pages the most relevant sources have been listed which are all in the public domain.

**in total 7 pages**

[2] http://www.unece.org/fileadmin/DAM/env/documents/2013/air/eb/ECE.EB.AIR.114_ENG.pdf
[3] COMMISSION IMPLEMENTING DECISION (EU) 2017/1442 of 31 July 2017 establishing best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for large combustion plants

# Disclaimer

This material has been prepared to provide a summary of the subject matter covered and for general informational purposes only. It does not purport to be comprehensive and it is not intended to be relied upon as professional advice. No reader should act on the basis of any matter contained in this material without first obtaining specific professional advice. Please refer to your specialists and/or advisors for specific advice.