The European Association of Internal
Combustion Engine Manufacturers

EUROMOT

EUROMOT POSITION

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2011 YEARS Promoting Engine in Society

Methane Number as a Parameter for Gas Quality Specifications

1. Introduction

In Europe, on EU but also on national level, there are currently a number of processes on-going looking into gas quality specifications. At an EU level, CEN has received a mandate (M400) to draw up standards for gas quality parameters for H-gas. This process will have implications for all gas users, whether domestic, industrial or in the power industry. In this context it is very important to include parameters which will enable all gas users to optimise their gas appliances. For gas engines, the combustion behaviour of natural gases is of particular importance. A key parameter in this context is the **methane number**. It describes the knock behaviour of fuel gases for reciprocating internal combustion gas engines. Manufacturers can only optimise engines if they know which minimum methane number the engine will have to handle.

High methane numbers mean high knock resistance; high knock resistance, in turn, means high efficiencies and thus lower CO_2 emissions. If methane numbers are too low, knock may cause engine damage or lead to losses in efficiency and performance if engine operation has to be adjusted to avoid knocking combustion. A low methane number might also have detrimental (rising) impact on the emissions of the engine.

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2. Methane Number (MN) calculation methods

At this point in time no standardised method for determining the methane number exists:

- One of the most frequently used method for determining the methane number was developed by AVL in the 1970s. Most members of EUROMOT currently calculate the methane number using the AVL method with some corrections that can be easily implemented. For all existing pipeline quality natural gases the AVL method for determining the methane number works reliably and sufficiently accurate if nitrogen is excluded from the gas composition. The AVL calculation tool is proprietary, however it can be licensed from AVL for a small fee.
- EUROMOT members also use and support EON-GasCalculation which produces end results similar to those of the AVL programme. EON-GasCalculation has the additional advantage that corrections for Nitrogen can be easily made. When using EON-GasCalculation the option without Nitrogen should be used.
- In addition, there is one member company of EUROMOT, MWM, which would provide their own MN calculation tool free of charge provided the company name is mentioned as source reference.

It should be noted that today's methods for calculating the methane number were developed for the natural gas qualities we currently see in pipelines. If in the future new types of gas, which comprise C5 and higher, are included in pipeline gas, corrections need to be made when calculating the Methane Number. This includes a number of rich LNG qualities currently on the market.

The AVL and the EON-Gas calculation method have not been developed for syngases.

3. EUROMOT Recommendation

Work on a standard method has been started with the aim **to specify one unique standard method on international level** (CEN, ISO) which is highly appreciated by the industry associated in EUROMOT.

For the time being our members **recommend using one in paragraph 2 mentioned method including the correction for leaving nitrogen out of the gas composition for the purpose of determining the knock resistance of fuel gases** since that works satisfactorily for the gas engine manufacturers. In case hydrocarbons higher than butane are present, additional corrections have to be made to compensate for the high knock sensitivity of these components. EUROMOT could also imagine, as a future project, to further develop a universal

MN calculation method including larger volume fractions of hydrogen as well as syngases for the whole industry.

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Johan Boij / Paul Zepf
Working Group Stationary Engines

EUROMOT is the European Association of Internal Combustion Engine Manufacturers. It is committed to promoting the central role of the IC engine in modern society, reflects the importance of advanced technologies to sustain economic growth without endangering the global environment and communicates the assets of IC engine power to regulators worldwide. For more than 20 years we have been supporting our members - the leading manufacturers of internal combustion engines in Europe, USA and Japan - by providing expertise and up-to-date information and by campaigning on their behalf for internationally aligned legislation. The EUROMOT member companies employ all over the world about 200,000 thoroughly skilled and highly motivated men and women. The European market turnover for the business represented exceeds 25 bn euros. Our **EU Transparency Register** identification number is **6284937371-73.**

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