



The Use of Conventional Meters for Non-conventional gases

8th November 2019 – Groningen

marcogaz
TECHNICAL ASSOCIATION
OF THE EUROPEAN NATURAL GAS INDUSTRY

Jim Sibley

Chairman WG Gas Metering

- **Background**

- Context
- Investigations so far...
 - What are the issues?
 - Effects on different meter technologies?
 - What has Marcogaz done so far?
 - What is Marcogaz doing to move to a resolution?

- **Safety and Accuracy considered but gas quality is out of the scope**
 - Construction specifications (sealing, gasket, sensors...) under assessment for suitability, safety and durability
- **The requirements in the MID Annex IV, MI-002 for gas meters states the following :**

“An instruments designed to measure, memorise and display the quantity of fuel gas (volume or mass) that has passed it”
- **Therefore in Marcogaz’s opinion, all non-conventional gases are fuel gases and are covered by the MID for gas meters**

- **Joint collaboration with Welmec WG11, Farecogaz and CEN/TC 237**
- **Development of a Meter Technology Evaluation Table that consider the affect on meters**
 - When different mixtures of non-conventional gases are measured
 - Technologies currently used for domestic, commercial, light industry and other applications
 - Also considers the effect on Volume Conversion Devices

What are the issues?

Hydrogen main combustion properties vs natural gas (pipeline/LNG origin):

	Pipeline NG	LNG	H ₂
Hs (MJ/m ³)	39.67	41.26	12.10
WI (MJ/m ³)	50.73	52.35	45.88
Rel. Density	0.6114	0.6211	0.0696
LEL/HEL (% VOL)	5/15		4/75
t° ignition (°C)	570 - 640		560

(15°C/15°C conditions)

H₂ → Reduced calorific value: existing meter could be undersized

- **Biogas**

- Raw (comprising principally methane and carbon dioxide, obtained from the anaerobic digestion of biomass)
- Cleaned (biogas raw without sulphurs)
- Dry (biogas cleaned without moisture (dew point below...))

- **Biomethane**

- Within the natural gas characteristics limits (EN 16723-1 & EN 16726 for H gas)

- **Hydrogen/Natural Gas mixtures**

- **100% Hydrogen (>97% H₂)**

- **Synthetic natural gas (H₂ + CO)**

Effects on different meter technologies?



Microsoft Excel
Worksheet

- Meter measuring ~100 %, H₂ will need to pass 3 times the volume due to lower CV
- Up to 10% H₂ - Influence on measuring principles

Measuring principle	Hydrogen Influence
Diaphragm, Rotary, Turbine meters	Independent from Hydrogen content
Ultrasonic, Thermal mass meters	Dependent on Hydrogen content

PTB states - conventional meters (TC 237) suitable for up to 10% H₂ mixture in natural gas, 100% biomethane and clean biogas

- **Marcogaz raised issue with the EU WG-MI**
 - **CEN/TC 237 - Non-conventional gases, work for working groups (WGs) on hydrogen mixtures**
 - Every WG under CEN/TC 237, Gas meters, will evaluate the Marcogaz table (GI-GM-17-14-D028) and provide a view on the effects of non-conventional gases, initially of various mixtures of hydrogen in natural gas including pure hydrogen on the products covered by their working group. All results shall be sent to the Secretary by 2018-09-28.
 - **CEN/TC 237 - Non-conventional gases, work for WGs on biogas and biomethane mixtures**
 - A similar decision taken that every WG under CEN/TC 237, Gas meters, will evaluate the Marcogaz table (GI-GM-17-14-D028) and provide an initial view on the effects of Non-conventional gases, initially of various mixtures of biogas and biomethane in natural gas including biogas, and biomethane as defined in EN 16723: Part 1.

What is Marcogaz doing to move to a resolution?

- NEWGASMET is a European funded project of three years duration starting in June 2019 with the EU contribution of just below €800k**

WP No	Work Package Title	Active Partners (WP leader in bold)
WP1	Literature overview on renewable gases effects on flow meters	GRTGAZ, LNE, LNE-LADG, FORCE, PTB, ENAGAS, FHA, ISSI, ITRON
WP2	Essential conformity requirements of 2014/32/EU Measuring Instrument Directive for gas meters using renewable gases	VSL, LNE, LNE-LADG, CMI, FORCE, NEL, PTB, ISSI, HONEYWELL, ITRON, METERSIT, SICK
WP3	Study for adequate flow calibration standards, inter-comparison and accuracy test campaign	PTB, LNE, LNE-LADG, CMI, NEL, VSL, ENAGAS, FHA, GRTGAZ, HONEYWELL, ITRON, METERSIT, SICK
WP4	Creating impact	FORCE, all partners
WP5	Management and coordination	LNE, all partners

- **So what do we know so far...**
 - **Marcogaz is actively involved with the Use of Conventional Meters for Non-conventional gases**
 - It facilitated the Joint collaboration between Welmec WG11, Farecogaz and CEN/TC 237 by encouraging the development of a Meter Technology Evaluation Table that consider the affect on meters
 - It believes all non-conventional gases are fuel gases and are covered by the MID for gas meters
 - **Meters measuring ~100% hydrogen**
 - Gross Calorific Value about third lower than Natural gas
 - Impact of meters, including physical size, could lead to changes in design
 - **EMPIR “NewGasMet” project and how this could help all players**



Thank you !

marcogaz

TECHNICAL ASSOCIATION
OF THE EUROPEAN NATURAL GAS INDUSTRY

Avenue Palmerston 4
1000 Brussels
BELGIUM

T: +32 2 237 11 39
www.marcogaz.org