

Gas meters and Volume Conversion Devices Annex IV(MI-002)

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Participants in the Drafting Group for MI-002

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	Wim Volmer (Chairman OIML TC8/SC7)	Agentschap Telecom
	Kurt Rasmussen (Convenor WG11)	FORCE
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- Kick-off meeting on 5th July
- Meetings on 20th and 27th July (before holyday departure)
- First draft sent by DG to WG11 members in August for comments
- Meetings on 31st August and 8th September to process comments
- Two versions of MI-002 annex sent to Welmec Committee on 15th September
- WG11 Gas meeting on 19th September
- WG11 Plenary 10-11th October : comments from Welmec will be presented



Reminder : the original goal

“add requirements for flowmeters for energy gases (hydrogen, biomethane)” (letter 03/07/2023)

For biomethane

- No specific modification required

For hydrogen

- A specific modification regarding $Q_{\max}/Q_{\min}$ ratio

Change minimum ratio for class 1.0 from 20 to 10 since some specific applications with H₂ and Coriolis meters are not able to fit with ratio above 20.

1.1. The flowrate range of the gas shall fulfil at least the following conditions:

Class	$Q_{\max} / Q_{\min}$	$Q_{\max} / Q_t$
1,5	≥ 150	≥ 10
1,0	≥ 10	≥ 5

- Add an article to cover the case where a gas meter can be used in different conditions with different types of gases (for example NG and H₂)

If a gas meter has multiple gas application-dependent flow rate ranges, each shall be inscribed on the meter, accompanied by a clear description of the gas application.

Welmec mandate uses wording « energy gases ».

DG proposes in that way to enlarge explicitly MI-002 to energy measurement.

- Allow gas meters to display energy
- Define Calorific Value determining devices and Energy Conversion devices
- Add units in Energy (Joules and Watt-hours)
- Enlarge Part II to all conversion devices and not only volume conversion devices (see below)
- Create Part III for Calorific Value determining devices (see below)

Enlarge Part II to all conversion devices and not only volume conversion devices

After discussion in DG, we consider that energy calculation (volume in base conditions x calorific value) is a simple operation which does not need additional MPE.

We propose to precise that :

- MPE in Part II are intended for volume conversion
- for energy conversion, error coming from calorific value is not included in conversion device MPE

8. **MPE for volume conversion devices**

- 0,5 % at ambient temperature $20\text{ °C} \pm 3\text{ °C}$, ambient humidity $60\% \pm 15\%$, nominal values for power supply;
- 0,7 % for temperature conversion devices at rated operating conditions;
- 1 % for other conversion devices at rated operating conditions.

Note:

The errors of the gas meter and, if applicable, of the calorific value determining device are not taken into account.

The conversion device shall not exploit the MPEs or systematically favour any party.

Create Part III for Calorific Value determining devices

- Based on the Part II organization for conversion devices
- Based on OIML R140 requirements with one change related to accuracy classes :

R140 defines accuracy classes A, B and C for measuring systems.

For CVDD, class A = 1 % and classes B or C = 0.5 %.

We propose to define classes 0.5 and 1.0 in the same format as gas meters accuracy classes.

11. Maximum permissible error (MPEs)

Table X

Class	0.5	1.0
MPE	0,5 %	1 %



Regarding discussions of Drafting Group and input from WG11 members, DG has also worked on additional modification for MI-002 annex

- Enlarge MI-002 to all gases
- Include class 0.5 gas meters in MI-002
- Reword the definition of accuracy classes in accordance with OIML R137

Enlarge MI-002 to all gases

Objective is especially to allow the inclusion of CO₂ measurement in MID.

➤ DG proposes to erase mention to « fuel gases » in MI-002.

Gas meters and conversion devices for CO₂ are expected to fit with current MPE in MID.

Include class 0.5 gas meters in MI-002

Currently these meters are certified according to OIML R137.

Industry users apply MID for class 1.0 and would like to do the same for class 0.5.

MID has become a standard for users and meters manufacturers.

Reword the definition of accuracy classes in accordance with OIML R137

Current MID draws a relation between $Q_{\max}/Q_{\min}$ ratio and Accuracy classes. Experts agreed on the fact that this statement does not fit to the reality

- DG proposes to conciliate MID with OIML R137. It would solve the issue of high ratio for class 1.0 gas meters in some H2 applications.

For accuracy classes 1.0 and 0.5:

$Q_{\max} / Q_{\min}$	$Q_{\max} / Q_t$
≥ 50	≥ 10
≥ 5 and < 50	≥ 5

For all accuracy classes, $Q_r / Q_{\max} = 1.2$

Some conclusions about the work and comments

- Uncomfortable discussions about the scope of MID regarding limit for light / heavy industry
This limit is not clearly defined and can be different depending on countries and applications
- Strong wish from TSO to include class 0,5 in MID for gas meters
- Reducing ratio Q_{max}/Q_{mix} can have impact on tenders specifications for TSO
- Should we mention more explicitly energy calculation ?
- Extend to all gases open a wide range to the MID scope
Should we mention explicitly CO₂ measurement ?



**THANK YOU FOR YOUR
ATTENTION!**

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