OIML Certificate

OIML Member State
The Netherlands

Number R137/2012-A-NL1-23.04 revision 4
Project number 4186496

Issuing authority	NMi Certin B.V. Person responsible: M.Ph.D. Schmidt
Applicant and Manufacturer	RMG Messtechnik GmbH Otto-Hahn-Strasse 5 35510 Butzbach Germany
Identification of the certified type	An **ultrasonic gas meter** Manufacturers mark: RMG Messtechnik GmbH Type: USM-GT400
Characteristics	See following pages

This OIML Certificate is issued under scheme A.

This Certificate attests the conformity of the above identified type (represented by the samples identified in the OIML Type Evaluation Report) with the requirements of the following Recommendation of the International Organization of Legal Metrology (OIML):

R 137-1:2012 "Gas meters"

Accuracy class 0.5

This Certificate relates only to the metrological and technical characteristics of the type of measuring instrument covered by the relevant OIML International Recommendation identified above.
This Certificate does not bestow any form of legal international approval.

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Issuing Authority **NMi Certin B.V., OIML Issuing Authority NL1**
27 October 2026

Certification Board

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The conformity was established by the results of tests and examinations provided in the associated reports:

- No. NMi-3498274-01 dated 19 May 2023 that includes 51 pages.
- No. NMi-3498274-01 revision 1 dated 22 May 2023 that includes 51 pages.
- No. NMi-3711995-01 dated 5 January 2024 that includes 23 pages.
- No. NMi-3812256-01 dated 10 October 2024 that includes 13 pages.

Characteristics of the measuring instrument
In Table 1 the general characteristics of the measuring instrument are presented.
In Table 2 and 3 the characteristics of the family of instruments are presented.

Table 1 General characteristics

Destined for the measurement of	Gas volume				
Environmental classes	M2 / E2				
Ambient temperature range	-40 … +70 °C				
Gas temperature range	-40 … +80 °C				
Designed for	Non-condensing humidity & condensing humidity				
Orientation	Horizontal, vertical up and vertical down (all orientations)				
Power supply voltage	19,2 – 26,4 V DC				
Software identification	Version number:	Checksum:			
	1.523	1AB7			
	1.527	D031			
	1.529	30CF			
	1.531	3E24			
	1.533	A47B			
Communication output	RS-485 / RS-232				
Transducers	Type	Frequency [kHz]	Pressure range [bar]	Admissible range of diameter [-]	Beam Angle [°]
	TNG 10-CP	120	0 – 150	DN200-DN900	circa 10
	TNG 10-CHP	120	0 – 300	DN200-DN900	
	TNG 20-LP	200	0 – 150	DN200-DN600	
	TNG 20-LHP	200	0 – 300	DN200-DN600	
	TNG 20-SP	200	0 – 150	DN80-DN150	

	TNG 20-SHP	200	0 – 300	DN80-DN150	

Table 2 Meter type, path configuration & installation conditions

The meter consists of a cylindrical spool piece with 6 horizontal direct paths, 2 paths on each level evenly distributed. See configuration below that can be combined in a single housing according to the table below.

GT400	Metrological relevant transducer paths	Flow disturbance	Minimum installation conditions up- and downstream [1] [6]
Standard	6	Mild & Severe	5D | FC[2] | 5D | USM[3] | 3D[5]
Standard	6	Mild & Severe	5D | FC[4] | 10D | USM[3] | 3D[5]

[1] xD = Minimum straight inlet & outlet piping length
[2] FC = Flow conditioner: CPA55E
[3] USM = Ultrasonic gas meter
[4] FC = Flow conditioner: LP35
[5] A temperature sensor can optionally be placed at least 1,5D downstream of the USM outlet.
[6] Each straight inlet & outlet piping length should not be shorter than each value specified.

The GT-400 meter is available in two variants reduced bore and full-bore variant.
The version with reduced bore can have a tapering with a chamfer of 7 degree to adjust the diameter of the connecting flanges to the diameter of the in- and outlet pipes.

Table 3 General characteristics of the family of instruments

Standard *(6 Path)*					
Diameter Nominal	**Internal bore[2]**		**Maximum[1]**	**Minimum[1]**	
	Reduced bore meter [mm]	**Full bore meter** [mm]	**V_{max}** [m/s]	**V_t** [m/s]	**V_{min}** [m/s]
3” (80 mm)	73,7	77,9	42,32	2,60	0,33
4” (100 mm)	97,2	102,3	37,43	2,43	0,30
6” (150 mm)	146,4	154,1	41,25	2,64	0,33
8” (200 mm)	193,7	202,7	39,59	1,89	0,30
10” (250 mm)	242,8	254,4	39,60	1,50	0,30
12” (300 mm)	288,8	303,2	39,86	1,48	0,30
14” (350 mm)	317,5	333,3	40,00	1,58	0,32
16” (400 mm)	363,5	381	40,15	1,61	0,32

Standard *(6 Path)*					
Diameter	**Internal bore**[2]		**Maximum**[1]	**Minimum**[1]	
Nominal	**Reduced bore meter**	**Full bore meter**	V_{max}	V_t	V_{min}
	[mm]	**[mm]**	**[m/s]**	**[m/s]**	**[m/s]**
18" (450 mm)	409,6	428,7	37,95	1,58	0,32
20" (500 mm)	455,6	477,8	35,78	1,53	0,31
24" (600 mm)	547,7	574,6	35,37	1,53	0,31
26" (650 mm)	631,9	---	39,86	1,53	0,30
28" (700 mm)	679,5	---	39,83	1,53	0,32
30" (750 mm)	730,3	---	39,79	1,53	0,31
32" (800 mm)	777,8	---	35.08	1,52	0,32
36" (900 mm)	876,3	---	27.63	1,52	0,32

Remarks regarding table 3

[1] If higher values are chosen for Q_{min} or Q_t and/or lower values for Q_{max}, it has to be taken into account that:
- If ratio $Q_{max} / Q_{min} \geq 50$ then: $Q_{max} / Q_t \geq 10$
- If ratio $Q_{max} / Q_{min} \geq 5$ and < 50 then: $Q_{max} / Q_t \geq 5$

[2] Depending on the internal bore, the flow rate in m^3/h can be calculated.
The corresponding flow rates can be calculated as follows:

$$Q = v \cdot \frac{1}{4} \cdot \pi \cdot D^2 \cdot 3600$$

Where:
Q = flow rate [m³/h]
v = velocity [m/s]
D = internal diameter [m]

Installation conditions:

Installation requirements

Any components which could affect the gas flow must be avoided within the prescribed inlet pipe length. The inlet pipe must be designed as a straight pipe section of a nominal diameter <3% difference compared to the gas meter.

The installation requirements, based on accuracy class and mild and/or severe flow disturbance are specified in table 2. The used flow conditioner is of type: CPA55E or LP35.

Working pressure

The spool piece and the transducers can be used up to the specified pressure as given in table 1.

The following working pressure ranges are applicable:
- For a working pressure range (p_{min}) ≥10 bar(g) a calibration on one pressure is sufficient. The working pressure range (p_{min} and p_{max}) as given on the name plate is allowed to be within ½·p_{fix} and 2·p_{fix}.

- For a working pressure range (p_{min}) <10 bar(g) a calibration shall be performed on the two pressures at p_{min} and p_{max} as given on the name plate.

The ultrasonic gas meter does not make use of an internal pressure or temperature sensor. The correct fixed density (ρ_{fix}) and fixed pressure setting (p_{fix}) shall be applied before calibration in the USM setting.

For a maximum working pressure (p_{max}) of the ultrasonic gas meter above 60 bar(a), a maximum calibration pressure ($p_{max\ calibration}$) of around 60 bar(a) is sufficient since this is the highest possible test pressure at any test location traceable to (inter)national standards.

Thermowell
A thermowell may be mounted at ≥ 1,5D and ≤ 5D from the outlet of the meter in unidirectional flow measurement.

Alternative welded configuration of the gas meter
The central meter body can be welded directly onto the flanges or to inlet and outlet pipes. The welding may not cause more than a 3% diameter step. The meter shall be installed as stated in "*Installation requirements*". The central meter body, including welded piping or welded flanges, shall be calibrated as a meter package during the examination for putting into use of the gas meter.

Maintenance
A transducer path pair or a single transducer on a path can be exchanged without deterioration of the metrological performance.

Certificate history:

This revision replaces the previous versions

Revision	Date	Description of the modification
0	22 May 2023	Initial
1	5 January 2024	LP35 FC added
2	10 October 2024	Approval of sizes up to DN900 based on family of meter approach. An error was made in the calculation and reporting of velocities in the previous revisions, it is rectified in this revision and correction of velocities in table 3.
3	17 November 2025	Firmware update. Correcting remark in table 2.
4	27 October 2026	Firmware update.