OIML Certificate

OIML Member State
The Netherlands

Number R137/2012-A-NL1-20.16 revision 4
Project number 3983639

Issuing authority	NMi Certin B.V. Person responsible: M.Ph.D. Schmidt
Applicant and Manufacturer	KROHNE Altometer Kerkeplaat 12 3313 LC Dordrecht The Netherlands
Identification of the certified type	An **ultrasonic gas meter** Type: ALTOSONIC V12 ALTOSONIC V12 Check ALTOSONIC V12D ALTOSONIC V12D Check ALTOSONIC V12E ALTOSONIC V12E Check
Characteristics	See following page(s)

This OIML Certificate is issued under scheme A.

This Certificate attests the conformity of the above identified type (represented by the sample(s) 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 or 1,0 (depending on meter type, piping configuration and flow disturbance, see tables 1, 2 and 3 on the next page for a detailed overview)

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.

This certificate and supporting reports comply with the requirements of OIML-CS-PD-07 clause 6.2.

Important note: Apart from the mention of the Certificate's reference number and the name of the OIML Member State in which the Certificate was issued, partial quotation of the Certificate and of the associated OIML Type Evaluation Report(s) is not permitted, although either may be reproduced in full.

Issuing Authority

NMi Certin B.V., OIML Issuing Authority NL1
12 December 2025

Certification Board

NMi Certin B.V.
Thijsseweg 11
2629 JA Delft
the Netherlands
T +31 88 636 2332
certin@nmi.nl
www.nmi.nl

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

- CVN-710381-01 Rev. 1a dated 25 March 2009 that includes 45 pages;
- NMi-14200114-01 dated 29 October 2014 that includes 18 pages;
- NMi 1902254-01 dated 21 December 2018 that includes 33 pages;
- NMi-1901377-01 dated 8 October 2019 that includes 22 pages;
- NMi-2408281-01 dated 31 January 2020 that includes 17 pages;
- NMi-2533860-01 dated 24 December 2020 that includes 12 pages;
- NMi-3666357-01 dated 6 June 2025 that includes 33 pages;
- NMi-3983639-01 dated 12 December 2025 that includes 23 pages.

Characteristics of the measuring instrument
The general characteristics of the family of instruments are presented in table 1 (ALTOSONIC V12), table 2 (ALTOSONIC V12D), table 3 (ALTOSONIC V12E) and table 4 (all meter types). Table 5 presents the operating ranges per transducer type (all meter types). The flow characteristics are presented in table 6 (ALTOSONIC V12), table 7 (ALTOSONIC V12D), and table 8 (ALTOSONIC V12E).

All meter types, ALTOSONIC V12, ALTOSONIC V12D, and ALTOSONIC V12E can also be equipped with an additional non-metrological relevant index, meter types: ALTOSONIC V12 Check, ALTOSONIC V12D Check, and ALTOSONIC V12E Check.

The ALTOSONIC V12E has identical general specifications as the ALTOSONIC V12D. However, the ALTOSONIC V12E has an improved production design with a different inlet configuration and underwent additional testing to achieve a lower classification and higher Qmax speeds. For better differentiation compared to products already in use (on the market), the ALTOSONIC V12E has been introduced.

Table 1 General characteristics ALTOSONIC V12 and ALTOSONIC V12 Check

Characteristics				
Path configuration	ALTOSONIC V12	Metrological relevant	5 horizontal reflecting measuring paths	
		Optional, non-metrological relevant	Optional, 1 vertical reflecting measuring path	
	ALTOSONIC V12 Check	Metrological relevant	5 horizontal reflecting measuring paths	
		Non-metrological relevant	1 vertical reflecting measuring path	
Accuracy class	ALTOSONIC V12, ALTOSONIC V12 Check	Mild flow disturbances	10D - USM	**0,5**
			2D - FC - 3D - USM	**0,5**
		Severe flow disturbances	2D - FC - 3D - USM	**0,5**
			10D - USM	**1,0**

Table 2 General characteristics ALTOSONIC V12D and ALTOSONIC V12D Check

Characteristics				
Path configuration	ALTOSONIC V12D	Metrological relevant	5 horizontal direct measuring paths	
		Optional, non-metrological relevant	Optional, 1 vertical reflecting measuring path	
	ALTOSONIC V12D Check	Metrological relevant	5 horizontal direct measuring paths	
		Non-metrological relevant	1 vertical reflecting measuring path	
Accuracy class	ALTOSONIC V12D, ALTOSONIC V12D Check	Mild flow disturbances	2D - FC - 8D - USM	**1,0**
		Severe flow disturbances	2D - FC - 8D - USM	**1,0**

Table 3 General characteristics ALTOSONIC V12E and ALTOSONIC V12E Check

Characteristics				
Path configuration	ALTOSONIC V12E	Metrological relevant	5 horizontal direct measuring paths	
		Optional, non-metrological relevant	Optional, 1 vertical reflecting measuring path	
	ALTOSONIC V12E Check	Metrological relevant	5 horizontal direct measuring paths	
		Non-metrological relevant	1 vertical reflecting measuring path	
Accuracy class	ALTOSONIC V12E, ALTOSONIC V12E Check	Mild flow disturbances	5D - FC - 5D - USM	**0,5**
		Severe flow disturbances	5D - FC - 5D - USM	**0,5**

Remarks regarding table 1, 2 and 3:

- xxD = Minimal length of straight inlet/outlet piping (where x can be 0…9).
- FC = Flow conditioner.
- USM = Ultrasonic gas meter.

Hereinafter:

- the ALTOSONIC V12 & ALTOSONIC V12 Check are also referred to as ALTOSONIC V12 (Check);
- the ALTOSONIC V12D & ALTOSONIC V12D Check are also referred to as ALTOSONIC V12D (Check);
- the ALTOSONIC V12E & ALTOSONIC V12E Check are also referred to as ALTOSONIC V12E (Check).

Table 4 General characteristics ALTOSONIC V12 (Check), ALTOSONIC V12D (Check) and ALTOSONIC V12E (Check)

Meter type	ALTOSONIC V12 (Check), ALTOSONIC V12D (Check) and ALTOSONIC V12E (Check)
Minimum – maximum flow rate	See table 6 - 8
Environmental classes	M3 / E2
Minimum pressure	See table 6 - 8
Maximum pressure	See table 5

Ambient temperature range	-40 °C / +55 °C			
Gas temperature range	See table 5			
Intended for the measurement of	Natural gas and Air			
Designed for	Condensing humidity			
Orientation	Horizontal, vertical up and vertical down (all orientations)			
Flow direction	Bi-directional			
Path angle	60° … 80°			
Power supply voltage	24 V DC			
Software identification: - Version number - Checksum	KAFKA 2.0.0.0 D4F94254	KAFKA 2.0.0.1 F0591D45	KAFKA 2.0.0.2 0EE46EDA	KAFKA 2.0.0.3 0x3834247E
	KAFKA 2.0.0.5 0xCF968C03	KAFKA 2.0.0.7 0x29DCEE4E	KAFKA 2.0.0.9 0xC289C65F	

Table 5 Operating ranges of the instrument per used transducer type

The gas temperature range and maximum operating pressure of the instrument is limited to the ranges as indicated below based on transducer type.

Transducer type [2] ALTOSONIC V12 (Check), ALTOSONIC V12D (Check) & ALTOSONIC V12E (Check)	Gas temperature range T_{min} … T_{max} [°C]	Maximum pressure p_{max} [bar(g)]	Sound frequency [kHz]
G5.00	-40 … +70 [1]	150	270
G5.01		431	
G5.02		204	
G5.03		431	
G6.00	-40 … +100 [1]	150	
G6.01		431	
G6.02		204	
G6.03		431	
G7.01	-40 … +100 [1]	150	330
G7.04		100	150

Remarks regarding table 5:

[1] The maximum gas temperature also depends on the chosen Q_{min} as specified in table 5 or 6. The resulting limiting value for T_{max} is normative.

[2] For severe flow disturbances the transducers are flush mounted (no protrusion inside the meter housing).

Table 6 General characteristics of the family of instruments - ALTOSONIC V12 (Check)

ALTOSONIC V12 (Check)									
Pipe Size		Minimum		Maximum			Minimum	p_{min} [4]	p_{max} [4]
Diameter Nominal	Associated internal bore[5]	Q_{min} T_{gas} ≤ 50 °C	Q_{min} T_{gas} ≤ 100 °C	Q_{max} Mild & Severe disturbances G5.00...G6.03	Q_{max} Mild disturbance G7.x	Q_{max} Severe disturbance G7.x	Q_t All		
NPS ["]	[mm]	[m³/h]	[m³/h]	[m³/h]	[m³/h]	[m³/h]	[m³/h]	[barg]	[barg]
4" (100 mm)	96	10	12	775	1010	910	39	0	According to table 5
6" (150 mm)	144	16	30	1800	2280	2050	90		
8" (200 mm)	191	20	45	3100	4000	3600	155		
10" (250 mm)	239	25	80	4300	6000	5400	215		
12" (300 mm)	284	35	120	6400	8200	7380	320		
14" (350 mm)	312	45	150	8100	10500	9450	405		
16" (400 mm)	358	60	195	10100	13000	11700	505		
18" (450 mm)	405	100	240	12400	16000	14400	620	0,5	
20" (500 mm)	448	150	285	14700	19000	17100	735	1,0	
24" (600 mm)	540	180	375	19400	25000	22500	970	2,0	
26" (650 mm)	585	250	500	21700	28000	25200	1085	2,5	
28" (700 mm)	633	300	600	24800	32000	28800	1240	3,0	
30" (750 mm)	708	400	800	27100	35000	31500	1355	4,0	

Remarks regarding table 6:

[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] The maximum Q_{max} depends on the transducer type and installation conditions (mild or severe flow disturbances).

[3] The maximum operating pressure (p_{max}) depends on the installed transducer according to table 5.

[4] Regarding p_{min} and p_{max} see also the section "Installation conditions, working pressure" on page 8.

[5] Associated internal bore may differ for certain schedule sizes. In such cases the alternate flowrates are recalculated as follows:

$$Q_{2=}\frac{{D_2}^2}{{D_1}^2}\cdot Q_1 = \left(\frac{D_2}{D_1}\right)^2 \cdot Q_1$$

D_1 : Associated internal bore dimension [mm] (above table)
D_2 : Alternate internal bore dimension [mm]
Q_1 : Associated flowrate [m³/h] (above table)
Q_2 : Alternate internal bore flowrate [m³/h]

Table 7 General characteristics of the family of instruments - ALTOSONIC V12D (Check)

ALTOSONIC V12D (Check)									
Pipe Size		Minimum		Maximum			Minimum	p_{min} [4]	p_{max} [4]
Diameter Nominal	Associated internal bore[5]	Q_{min} T_{gas} ≤ 50 °C	Q_{min} T_{gas} ≤ 100 °C	Q_{max} Mild & Severe disturbances G5.00...G6.03	Q_{max} Mild disturbance G7.x	Q_{max} Severe disturbance G7.x	Q_t All		
NPS ["]	[mm]	[m³/h]	[m³/h]	[m³/h]	[m³/h]	[m³/h]	[m³/h]	[barg]	[barg]
4" (100 mm)	96	10	12	775	1010	950	39	0	According to table 5
6" (150 mm)	144	16	30	1800	2280	2130	90		
8" (200 mm)	191	20	45	3100	4000	3750	155		
10" (250 mm)	239	25	80	4300	6000	5650	215		
12" (300 mm)	284	35	120	6400	8200	7700	320		
14" (350 mm)	312	45	150	8100	10500	9850	405		
16" (400 mm)	358	60	195	10100	13000	12200	505		
18" (450 mm)	405	100	240	12400	16000	15000	620		
20" (500 mm)	448	150	285	14700	19000	17800	735		
24" (600 mm)	540	180	375	19400	25000	23450	970		
26" (650 mm)	585	250	500	21700	28000	26250	1085		
28" (700 mm)	633	300	600	24800	32000	30000	1240		
30" (750 mm)	708	400	800	27100	35000	32800	1355		

Remarks regarding table 7:

[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] The maximum Q_{max} depends on the transducer type and installation conditions (mild or severe flow disturbances).

[3] The maximum operating pressure p_{max}) depends on the installed transducer according to table 5.

[4] Regarding p_{min} and p_{max} see also the section “Installation conditions, working pressure” on page 8.

[5] Associated internal bore may differ for certain schedule sizes. In such cases the alternate flowrates are recalculated as follows:

$$Q_{2=}\frac{{D_2}^2}{{D_1}^2}\cdot Q_1 = \left(\frac{D_2}{D_1}\right)^2 \cdot Q_1$$

D_1 : Associated internal bore dimension [mm] (above table)
D_2 : Alternate internal bore dimension [mm]
Q_1 : Associated flowrate [m³/h] (above table)
Q_2 : Alternate internal bore flowrate [m³/h]

Table 8 General characteristics of the family of instruments - ALTOSONIC V12E (Check)

ALTOSONIC V12E (Check)							
Pipe Size		Minimum		Maximum	Minimum	p_{min} [4]	p_{max} [4]
Diameter Nominal	Associated internal bore[5]	Q_{min} T_{gas} ≤ 50 °C	Q_{min} T_{gas} ≤ 100 °C	Q_{max} Mild & Severe disturbance ALL transducers	Q_t All		
NPS ["]	[mm]	[m³/h]	[m³/h]	[m³/h]	[m³/h]	[barg]	[barg]
4" (100 mm)	96	10	12	1070	39	0	According to table 5
6" (150 mm)	144	16	30	2405	90		
8" (200 mm)	191	20	45	4230	155		
10" (250 mm)	239	25	80	6625	215		
12" (300 mm)	284	35	120	9350	320		
14" (350 mm)	312	45	150	11285	405		
16" (400 mm)	358	60	195	14860	505		
18" (450 mm)	405	100	240	19015	620		
20" (500 mm)	448	150	285	23250	735		
24" (600 mm)	540	180	375	33800	970		

Remarks regarding table 8:

[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] The maximum Q_{max} depends on the transducer type and installation conditions (mild or severe flow disturbances).

[3] The maximum operating pressure (p_{max}) depends on the installed transducer according to table 5.

[4] Regarding p_{min} and p_{max} see also the section "Installation conditions, working pressure" on page 8.

[5] Associated internal bore may differ for certain schedule sizes. In such cases the alternate flowrates are recalculated as follows:

$$Q_{2=}\frac{{D_2}^2}{{D_1}^2}\cdot Q_1 = \left(\frac{D_2}{D_1}\right)^2 \cdot Q_1$$

D_1 : Associated internal bore dimension [mm] (above table)
D_2 : Alternate internal bore dimension [mm]
Q_1 : Associated flowrate [m³/h] (above table)
Q_2 : Alternate internal bore flowrate [m³/h]

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 the same nominal diameter as the gas meter. The necessary straight pipe length is stated on the name plate of the meter.

The installation requirements, based on accuracy class and mild and/or severe flow disturbance are specified in table 1, 2 and 3. The used flow conditioner (if applicable) is of type: "KROHNE flow conditioner" or "FC3".

Working pressure
The spool piece and the transducers can be used up to the specified pressure in table 5 (p_{max} depending on transducer type).

The two pressures, at which the meter shall be calibrated, without intermediate adjustment over its full flow rate range during initial verification ($p_{min\ calibration}$ and $p_{max\ calibration}$), shall be equal to the operating pressure range (p_{min} and p_{max}) as given on the type plate.

In case the claimed type plate values (p_{max} -p_{min}) <= (50 – p_{min} table 6, 7, 8), only 1 calibration pressure ($p_{calibration}$) is necessary.

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 allowed since this is the highest possible test pressure at any test location traceable to (inter)national standards.

Meter in series
It is allowed to install the ALTOSONIC V12 (Check), ALTOSONIC V12D (Check) and ALTOSONIC V12E (Check) meters in series with another ultrasonic meter by directly connecting the outlet of the first meter to the inlet of the second meter, while applying the following conditions:
- Both meters are calibrated at the same time, being mounted together;
- The installation conditions of both meter types are fulfilled.

Reduced bore
In case the ALTOSONIC V12 (Check), ALTOSONIC V12D (Check) or ALTOSONIC V12E (Check) is applied in series with a reduced bore meter, the following condition is also applicable:
- If the ALTOSONIC V12 (Check), ALTOSONIC V12D (Check) or ALTOSONIC V12E (Check) is mounted on the second position, then the angle of inclination of the reduced bore shall be less than 7°.

Non-essential parts:

Krohne Care-Board (optional)
A board with additional IO and a diagnostic expert system to interpret standard diagnostic parameters that provides also long term trending.
It is allowed to add the Care-Board to existing meter electronics which were originally setup without a Care-Board.

OIML Certificate

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Number R137/2012-A-NL1-20.16 revision 4
Project number 3983639

Certificate history:
This revision replaces the previous versions.

Revision	Date	Description of the modification
0	24 December 2020	Initial
1	20 December 2022	Updated the software to V2.0.05
2	19 January 2023	Typo correction in the software number V2.0.0.5
3	6 June 2025	Added V12E and software number V2.0.0.7
4	12 December 2025	Added M3 class, Q_{max} adjustment, additional V12E family meters, and software number V2.0.0.9