

OIML Member State
The Netherlands

Number R137/2012-B-NL1-19.01
Project number 2282746
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Issuing authority NMI Certin B.V.
Person responsible: C. Oosterman

Applicant and Manufacturer Daniel Measurement and Control, Inc.
11100 Brittmoore Park Drive
77041 Houston, Texas
United States of America

Manufacturer's name Daniel

Identification of the certified type An **ultrasonic gas meter**
Type: 3414 / 3415 / 3416 / 3417 / 3418 GUSM or Senior Sonic

Characteristics See page 2 and further

This OIML Certificate is issued under scheme B

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

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.

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**
3 May 2019


C. Oosterman
Head Certification Board

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The conformity was established by the results of tests and examinations provided in the associated report(s):

- No. NMI-15200438-01 dated 3 November 2015 that includes 47 pages;
- No. NMI-15200787-01 dated 25 February 2016 that includes 50 pages;
- No. NMI-16200416-01 dated 19 August 2016 that includes 11 pages;
- No. NMI-16200582-02 dated 3 November 2016 that includes 7 pages.
- No. NMI-1902613-01 dated 23 August 2018 that includes 51 pages;
- No. NMI-1902374-01 dated 16 November 2018 that includes 19 pages;
- No. NMI-2282746-01 dated 3 May 2019 that includes 13 pages;
- No. NMI-2282746-02 dated 3 May 2019 that includes 26 pages.

Characteristics of the measuring instrument

In Table 1 the general characteristics of the measuring instrument are presented. Table 2 gives an overview of the general characteristics of the family of instruments.

The construction of the measuring instrument is recorded in Documentation folder number T11159-3.

The ultrasonic gas meter is produced at the following production locations:

- Daniel Measurement and Control, Inc., 11100 Brittmoore Park Drive, 77041 Houston, Texas, United States of America.
- Emerson SRL, Emerson street no. 4, 400461 Cluj-Napoca, Romania.

Gas meter configuration

Model 3414 Model 3414 is equipped with 4 measuring paths in a horizontal configuration.

Model 3415 Model 3415 contains a model 3414 path layout and electronics. The model 3415 is additionally equipped with one check path which is connected to a separate set of electronics.

Model 3416 Model 3416 contains a model 3414 path layout and electronics. The model 3416 is additionally equipped with one check path and one diagnostic path which are connected to a separate set of electronics.

Model 3417 Model 3417 is composed of two model 3414 electronics and transducers built into a model 3417 spool piece. The meter can be used in the following configurations:

1. Two separate gas meters
2. Pay / check configuration

Model 3418 Model 3418 is equipped with 8 measuring paths in a horizontal configuration.

Table 1 General characteristics

Destined for the measurement of	Gas volume	
Environmental classes	M1 / E2	
Accuracy class	0,5	
Operating pressure range for meters equipped with standard mounts	<p>The spoolpiece and transducers may be used at a pressure between 7 and 425 bar(g). For this pressure range the flow characteristics as mentioned in table 2 are applicable.</p> <p>If the minimum pressure is between 3,5 and 7 bar(g), the values for Q_{max} have to be reduced to 50% of the values indicated in table 2.</p> <p>For T32 transducers only: if the minimum pressure is between 7 and 10 bar(g), the values for Q_{max} have to be reduced to 80% of the values indicated in table 2.</p> <p>If the minimum pressure is between 3,5 and 7 bar(g), the values for Q_{max} have to be reduced to 50% of the values indicated in table 2.</p> <p>The measuring range shall be 1:20 minimally.</p>	
Operating pressure range for meters equipped with Isolated Mounts on Chordal paths	<p>The spoolpiece and transducers may be used at a pressure between:</p> <ul style="list-style-type: none"> - 0 and 105 bar(g) for meter size 4 to 12 inch; - 8 and 105 bar(g) for meter size 14 to 42 inch. <p>For these pressure ranges, the flow characteristics as mentioned in table 2 are applicable.</p> <p>The T200 transducers are always installed based on isolated mounts for meter size 4 to 12 inch with a pressure range of 0 up to and including 259 bar.</p>	
Gas temperature range depending on transducer type Txxx	<p>T11: -20°C / +55°C</p> <p>T12: -20°C / +55°C</p> <p>T21: -20°C / +55°C</p> <p>T22: -40°C / +55°C</p>	<p>T32: -40°C / +55°C</p> <p>T41: -50°C / +100°C</p> <p>T200: -50°C / +125°C</p>
Ambient temperature range	-40°C / +70°C	
Designed for	condensing humidity	
Orientation	all orientations	
Power supply voltage	10 – 36 V DC	
Software identification (version and checksum) for 3414, 3415, 3416, 3417	<p>1.13</p> <p>1.22</p> <p>1.24</p> <p>1.27</p> <p>1.30</p> <p>1.31</p> <p>1.35</p>	<p>0386726438</p> <p>3499386616</p> <p>1869761847</p> <p>2717395331</p> <p>2620208593</p> <p>3367318398</p> <p>1438734832</p>
Software identification (version and checksum) for 3414, 3415, 3416, 3417, 3418	1.41	2979557838

Table 2 General characteristics of the family of instruments

The meter has the following flow characteristics:

Meter type	Diameter size			Maximum v_{max} [m/s]	Minimum v_t [m/s]	Minimum v_{min} [m/s]	
	Inch	DN	Typical ranges [mm]				
3414, 3415, 3416, 3417	4	100	80 ~ 108	30,5	1/10 v_{max}	0,5	
	6	150	124 ~ 161				
3414, 3415, 3416, 3417, 3418	8	200	173 ~ 212				
	10	250	216 ~ 265				
	12	300	257 ~ 315				
	14	350	284 ~ 343				
	16	400	325 ~ 394				
	18	450	367 ~ 445				
	20	500	408 ~ 495				32,5
	24	600	491 ~ 597				30,5
	30	750	730 ~ 749				26
	36	900	876 ~ 899	23			
42	1050	1029 ~ 1048	21				

Notes:

- If higher values are chosen for v_{min} and/or lower values for v_{max} it has to be taken into account that $v_{min} \leq 0,05 v_{max}$ and $v_t \leq 0,2 v_{max}$.

The 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 = diameter [m]

- Meter type 3414, 3415, 3416 and 3417 can be manufactured from 4 - 42 inch.
- Meter type 3418 can be manufactured from 8 - 42 inch.

Installation conditions:

Inlet piping and flow straightener

The meter is used, with the indicated minimum piping lengths, in one of the following configurations.

Type 3414 / 3415 / 3416 / 3417:

- For mild disturbances;
5D piping followed by a CPA 50E straightener followed by 10D piping at the inlet of the meter.
- For mild and severe disturbances;
5D piping followed by a CPA 55E straightener followed by 10D piping at the inlet of the meter.

Type 3418:

- For mild and severe disturbances;
5D piping at the inlet of the meter.