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designated and notified by the Netherlands to perform tasks with respect to conformity assessment procedures mentioned in article 17 of Directive 2014/32/EU, after having established that the measuring instrument meets the applicable requirements of Directive 2014/32/EU, to:

Manufacturer Metreg Technologies GmbH
Neckaraue 9
71686 Remseck
Germany

Measuring instrument **A Rotary Displacement Gas Meter**

Type	:	MRM
Manufacturer's mark or name	:	Metreg Technologies GmbH
Destined for the measurement of	:	Gas volume
Accuracy class	:	1.0
Environment classes	:	M2 / E1
Gas temperature range	:	-25 °C / +55 °C
Ambient temperature range	:	-25 °C / +55 °C
Location	:	Open

Further properties are described in the annexes:

- Description T10658 revision 3.
- Documentation folder T10658-3.

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Remark This revision replaces the previous versions, except for its documentation folder.

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1 General information about the gas meter

All properties of the gas meter, whether mentioned or not, shall not be in conflict with the legislation.

1.1 Essential parts

1.1.1 Measuring part

The dimensions of the rotors are presented in the table below, while also the appertaining volumes are indicated.

Nominal diameter [mm]	G-value	Rotor length [mm]	Rotor thickness [mm]	Rotor diameter [mm]	Rotor mass [kg]	Volume (V) [dm ³]
25	G10	91,6	20,36	46,25	0,10	0,177
50	G16	108,8	21,00	47,0	0,14	0,210
	G25	147,0	21,00	47,0	0,18	0,283
	G40	120,9	32,35	72,8	0,36	0,566
	G65	150,0	32,35	72,8	0,43	0,708
80	G100	225,0	32,35	72,8	0,62	1,05
	G160-3"	222,8	51,15	117,4	1,48	2,78
100	G160-4"	222,8	51,15	117,4	1,48	2,78
	G250	335,8	51,15	117,4	2,30	4,20
	G400-4"	454,0	51,15	117,4	3,27	5,66
150	G400-6"	274,5	90,40	206,1	6,32	10,5
	G650	411,6	90,40	206,1	9,13	15,7
200	G1000	517,8	90,40	206,1	11,03	19,7

1.1.2 Bearings of the rotors

The bearings of the rotors are presented in document 10658/0-04 and 10658/0-05.

The bearings which are used have the following characteristics:

Nominal diameter [mm]	G-value	Rotor length [mm]	Rotor thickness [mm]	Rotor diameter [mm]	Rotor mass [kg]	Volume (V) [dm ³]
25	G10	91,6	20,36	46,25	0,10	0,177
50	G16	108,8	21,00	47,0	0,14	0,210
	G25	147,0	21,00	47,0	0,18	0,283
	G40	120,9	32,35	72,8	0,36	0,566
	G65	150,0	32,35	72,8	0,43	0,708
80	G100	225,0	32,35	72,8	0,62	1,05
	G160-3"	222,8	51,15	117,4	1,48	2,78
100	G160-4"	222,8	51,15	117,4	1,48	2,78
	G250	335,8	51,15	117,4	2,30	4,20
	G400-4"	454,0	51,15	117,4	3,27	5,66
150	G400-6"	274,5	90,40	206,1	6,32	10,5
	G650	411,6	90,40	206,1	9,13	15,7
200	G1000	517,8	90,40	206,1	11,03	19,7

Type 1: deep groove ball bearing with dust cap on both sides.

Type 2: deep groove ball bearing with dust cap on one side, the other side is equipped with a snap ring groove on the outer ring.

1.2 Essential characteristics

1.2.1 The meter has the following characteristics:

Nominal diameter [mm]	G-value	Q_{max} [m ³ /h]	Q_{min} [m ³ /h]	Q_t [m ³ /h]	Flange to flange dimension [mm]	Accuracy class
25	G10	16	0,4	1,6	130	1,0
50	G16	25	0,5	2,5	171	1,0
	G25	40	0,5	2,0	171	1,0
	G40	65	0,5	3,25	171	1,0
	G65	100	0,5	5,0	171	1,0 or 1,5
80	G100	160	0,65	8,0	171	1,0 or 1,5
	G160-3"	250	1,6	12,5	241	1,0 or 1,5
100	G160-4"	250	1,6	12,5	241	1,0 or 1,5
	G250	400	2,0	20,0	241	1,0 or 1,5
	G400-4"	650	3,2	32,5	241	1,0 or 1,5
150	G400-6"	650	6,5	32,5	450	1,0 or 1,5
	G650	1000	10,0	50,0	450	1,0
200	G1000	1600	16,0	80,0	600	1,0

The maximum pressure for all the rotary displacement gas meters is 21 bar(g).

1.2.2 Flow rate range

The flow rate range shall fulfil the following conditions:

Class	Q_{max} / Q_{min}	Q_{max} / Q_t
1,5	≥ 150	≥ 10
1,0	≥ 20	≥ 5

1.3 Essential shapes

1.3.1 The nameplate is bearing at least, good legible, the following information:

- CE marking including the supplementary metrological marking (M + last 2 digits of the year in which the instrument has been put into use);
- Notified Body identification number, following the supplementary metrological marking;
- EU-type examination certificate no. T10658;
- manufacturer's name, registered trade name or registered trade mark;
- manufacturer's postal address;
- serial number of the meter and year of manufacture;
- Q_{min} , Q_{max} and Q_t in m³/h;
- maximum working pressure $p_{max} = \dots$ bar;
- nominal cyclic volume: $V = \dots$ dm³;

- ambient temperature range;
- accuracy class;
- pulse values of HF, MF and LF frequency outputs (if applicable);
- indication of the flow direction, e.g. an arrow.

The following information is mentioned in the manual:

- mechanical environment class;
- electromagnetic environment class.

An example of the markings is shown in document no. 10658/1-01, 10658/2-02 10658/2-02.

1.3.2 Sealing: see chapter 2.

1.4 Conditional parts

1.4.1 Construction

In addition to the essential parts as mentioned at 1.1, the meter contains at least the following conditional parts:

- - housing;
- - transmission;
- - register;
- - front and rear cover;
- - synchronization wheels;
- - pressure measuring points.

1.4.2 Housing

The gas meter has a housing, which has sufficient tensile strength. The meters housing is made out of aluminium and is anodized. An example is shown in document no. 10658/0-01 and 10658/0-03 up to and including 10658/0-05.

1.4.3 Transmission

The transmission between the measuring part and the register is executed by means of a magnet coupling. The register is adjustable via adjustment wheels. An example of the gear transmission is presented in document 10658/0-06. A gear ratio table is presented in document no. 10658/0-07.

1.4.4 Register

The measured volume is presented by means of a mechanical register. Examples are stated in document no. 10658/0-06. The index can be rotated over a maximum of 359° for flow directions left-right and bottom-top. The sealing of the index has to be broken to rotate the index.

The register is built up as follows:

size	number of drums		control-element [m ³]
	before the comma	behind the comma	
G10 – G25	6	2	0,002
G40 – G400	7	1	0,02
G650 – G1000	8	0	0,2

1.4.5 Front and rear cover

The entrance to the transmission from the measuring part to the register is shielded by means of a front cover. The meters also have a rear cover which holds the two rear main bearings of both rotors.

- 1.4.6 Synchronisation wheel
The rotors are coupled together mechanically by means of a synchronisation wheel.
- 1.4.7 Pressure tappings
The housing contains two pressure tappings to determine the inlet and outlet pressure. The inlet pressure tapping is provided with the indication "pm" or "pr". A second pressure tapping at the outlet is provided with the indication "p".

1.5 Non-essential parts

- 1.5.1 Low frequency sensor in the index. Optionally two low frequency sensors can be equipped in the index simultaneously.
- 1.5.2 Medium frequency pulse output, located on the transmission shaft, see documentation 10658/1-02.
- 1.5.3 High frequency pulse output by means of a black/white rotating disk in the rear cover.
- 1.5.4 High frequency pulse output by means of an inductive proximity sensor, situated in an aluminum head, see documentation 10658/1-03.
- 1.5.5 Oil filling plug(s), oil drain plug(s) and oil sight glass for lubrication and checking oil level in the meter.
- 1.5.6 Two temperature points (with installed temperature tappings or cover plugs).
- 1.5.7 The meter can (optionally) be equipped with one or two encoders on the index.

2 Seals

The following items of the meter are sealed:

- the nameplate(s) of the meter;
- the entrance to the register is sealed with one or more seals;
- the entrance to the measuring part (front and back cover) is sealed with one or more seals;
- if a separate nameplate is used (e.g. to show a pulse value) this nameplate has to be sealed (this can also be in the form of a tampering evident sticker).

See the drawings no. 10658/0-05 for an example of the sealing.