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Manufacturer	Metreg Technologies GmbH Tränkeweg 9 15517 Fürstenwalde Germany		
Measuring instrument	A turbine gas meter		
	Type	:	MTM
	Destined for the measurement of	:	Gas volume
	Accuracy class	:	Class 1,0
	Environment classes	:	M1 / E1
	Gas temperature range	:	+5 °C / +55 °C
	Ambient temperature range	:	+5 °C / +55 °C
	Further properties are described in the annexes: – Description T10660 revision 0; – Documentation folder T10660-1.		
Valid until	1 October 2024		

Issuing Authority **NMI Certin B.V., Notified Body number 0122**
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C. Oosterman
Head Certification Board

NMI Certin B.V.
Hugo de Grootplein 1
3314 EG Dordrecht
The Netherlands
T +31 78 6332332
certin@nmi.nl
www.nmi.nl

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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 measuring part consists of a cartridge including all metrological essential parts such as turbine wheel, bearings, shafts, primary gears and inlet flow straighteners. The dimensions of the turbine wheel are presented in the table below. See drawing no. 10660/0-07 for the measurements of the inlet flow straightener and nose cone. The number, the appertaining angle of the blades and other essential dimensions of the turbine wheel are given below.

Diameter [mm]	G – value	Impeller diameter [mm]	Blade height [mm]	Vane thickness [mm]	Blade angle [degrees]	Number of blades
50	65	51	5	15,5	45	12
80	100	83	12	22	45	14
	160					
	250					
100	160	103	15	28	45	14
	250					
	400					
150	400	154	22	27	45	16
	650					
	1000					
200	650	198	40	27	45	18
	1000					
	1600					
250	1000	246	32	30	45	20
	1600					
	2500					
300	1600	296	35,5	30	45	22
	2500					
	4000					

1.1.2 Bearings

The characteristics of the deep groove ball bearings, including their lubrication method in the applicable operating pressure range, are given in the table below. The accompanying drawing is given in document no. 10660/0-06.

Diameter [mm]	Bearing characteristics							
	Main shaft [mm]		Dynamic load rating C_r [N]		Static load rating C_{or} [N]		Maximum operating pressure	
	inlet	outlet	inlet	outlet	inlet	outlet	16 bar(g)	100 bar(g)
50	2	2	286	286	90	90	permanently lubricated bearings, double shielded	external oil pump lubricated bearings, single or double shielded
80	3	3	644	644	215	215		
100	4	3	1339	644	488	215		
150	5	4	1646	1339	663	488		
200	6	6	2522	2522	1057	1057	-	
250	8	8	3369	3369	1363	1363		
300	10	10	6100	6100	2600	2600		

1.1.3 Internal cartridge

An exploded view of the internal cartridge is given in document no. 10660/0-05. The metrological characteristics are defined by each individual cartridge. If cartridges are exchanged between meter housings the metrological characteristics of a certain cartridge are maintained.

1.1.4 Nose cone and Inlet flow straighteners

The inlet of the internal cartridge contains a nose cone and flow straightener. Document no. 10660/0-07 gives a detailed drawing including the dimensions.

1.1.5 Straight inlet tubing

The meter housing should always be equipped with a 2 DN straight inlet piece in case of severe flow disturbances (see also the main name plate in document no. 10660/0-02). For mild flow disturbances there is no straight inlet piece necessary. See also the prescribed installation conditions in chapter 3.

1.2 Essential characteristics

1.2.1 The table below gives the essential characteristics regarding flow rate and pressure range. Further essential characteristics are described in the evaluation certificate involved.

DN [mm]	G-value	maximum Q_{max} [m ³ /h]	maximum Q_t [m ³ /h]	Minimum Q_{min} [m ³ /h] for the specified pressure range			
				MR 1:20		MR 1:30	
				0..100 bar(g)	8..100 bar(g)	8..100 bar(g)	16..100 bar(g)
50	65	100	20	5	-	3,3	-
	100	160	32	-	8	-	5,3
80	160	250	50	12,5	-	8,3	-
	250	400	80	20	-	13,3	-
100	160	250	50	-	12,5	-	8,3
	250	400	80	20	-	13,3	-
150	400	650	130	32,5	-	21,7	-
	650	1000	200	-	32,5	-	21,7
200	1000	1600	320	80	-	53,3	-
	1600	2500	500	125	-	83,3	-
250	1000	1600	320	-	80	-	53,3
	1600	2500	500	125	-	83,3	-
300	2500	4000	800	200	-	133,3	-
	4000	6500	1300	325	-	216,7	-

Remarks regarding the table above:

- The application of permanently lubricated bearings limits the maximum operating pressure to 16 bar(g). See also the table in section 1.1.2.
- MR = measuring range ($Q_{max}/Q_{min} = 1:20$ or $1:30$).

1.2.2 Flow rate range

The flow rate range shall fulfill the following conditions:

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

1.3 Essential shapes

1.3.1 The name plate or casing of the meter is bearing at least, good legible, the information as stated below:

- a) the approval number, in this case T10660;
- b) the manufacturer's trade mark or his trade name;
- c) type designation (in this case MTM);
- d) the serial number of the meter and its year of manufacture;
- e) accuracy class;
- f) Q_{\max} , Q_{\min} and Q_t in m^3/h ;
- g) the gas temperature range and pressure range:
 - $t_{\min} - t_{\max} = \dots - \dots \text{ }^\circ\text{C}$;
 - $p_{\min} - p_{\max} = \dots - \dots \text{ bar(g)}$;
- h) the pulse value of LF and HF frequency outputs;
- i) indication of the flow direction;
- j) indication of the measuring point for working pressure (p_m or p_r) and other pressure tappings p ;
- k) the necessary straight pipe length in front of the meter (in this case 2 DN for severe flow disturbances);
- l) CE marking according the MID;

An example of the markings is shown in document no. 10660/0-02 containing the main name plate and oil pump plate.

The oil pump plate contains the prescribed oil for bearing lubrication, which is "Shell Morlina S2 BL5" or any other identical grade of lubricant. Specific operating conditions, like amount and frequency of (re)lubrication, are also mentioned on this name plate.

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.
- Gear transmission including the adjustment gears.
- Pressure measuring point.
- Register.
- Low frequency impulse output (optional).
- High frequency impulse output (optional).

1.4.2 Housing

The gas meter has a aluminium or a cast steel housing, which has sufficient tensile strength. An example is shown in document no. 10660/0-01, 10660/0-03 and 10660/0-04.

1.4.3 Gear 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. A table of possible adjusting wheels is given in document no. 10660/0-08.

1.4.4 Pressure measuring point

The housing contains one or two pressure tapplings to determine the reference pressure at the inlet of the meter. In case the meter contains two pressure tapplings both are internally connected to the same measuring point inside the housing. The pressure tapplings are provided with the indication "p_m" or "P_r".

1.4.5 Register

The measured volume is presented by means of a conventional mechanical register. Examples of the register are stated in document no. 10660/0-01 and 10660/0-04.

The registers are built up as follows:

size	number of drums		control-element [m ³]
	before the comma	behind the comma	
G65	6	2	0,002
G100 ... G1600	7	1	0,02
G2000 ... G4000	8	0	0,2

1.4.6 Low frequency impulse output (optional)

The register can optionally be equipped with an encoder output (low frequency impulse output). The appertaining impulse value is stated on the meter.

1.4.7 High frequency impulse output (optional)

The meter is provided with a high frequency impulse output, at which the appertaining impulse value is stated on the meter.

1.5 Non-essential parts

The meter has the following non essential parts:

- Temperature measuring point / thermowell which is indicated with "T_m".
- Lubrication system (optional, see description below).
- Hand lever pump to operate the lubrication system (optional, see description below).

The meter is not equipped with the lubrication system and hand lever pump if permanently lubricated double shielded bearings are used, see section 1.1.2.



Description

Number **T10660** revision 0
Project number SO14203178
Page 5 of 5

2 Seals

The following items of the meter are sealed:

- The name plates of the meter (unless fixed to the meter).
- The entrance to the measuring part is sealed with one or more seals.
- The entrance to the register is sealed with one or more seals.

See drawing no. 10660/0-04 for an example of the sealing.

3 Installation conditions

The meter can operate in the following positions: horizontal flow, vertical flow up and vertical flow down.

Any components which cause severe flow disturbances and could affect the gas flow must be avoided within the prescribed inlet pipe length which is 2 DN. The inlet pipe must be designed as a straight pipe section of the same nominal diameter as the gas meter. For mild flow disturbances there is no prescribed inlet pipe length.