

WELMEC

European Cooperation in Legal Metrology

Guide for information in the type examination certificate, to be borne by and to be accompanied (or provided) by the markings on the gas meters



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European Cooperation in Legal Metrology

WELMEC is a cooperation between the legal metrology authorities of the Member States of the European Union and EFTA.

This document is one of a number of Guides published by WELMEC to provide guidance to manufacturers of measuring instruments and to Notified Bodies responsible for conformity assessment of their products.

The Guides are purely advisory and do not themselves impose any restrictions or additional technical requirements beyond those contained in relevant EU Directives.

Alternative approaches may be acceptable, but the guidance provided in this document represents the considered view of WELMEC as to the best practice to be followed.

Published by:
WELMEC Secretariat

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1 Definitions and abbreviations

In this document the following abbreviations and definitions apply:

MID Measuring Instrument Directive, directive 2004/22/EC of the European parliament and of the council of 31 March 2004 on measuring instruments.

TEC An EC type examination certificate under Annex B or an EC design examination certificate under Annex H1 of the MID.

Nameplate The plate required by MID for the complete measuring system, bearing the "CE", "M", year of affixing, Notified Body number and other mandatory inscriptions as defined by article 9 of Annex I of the MID.

NB Notified Body designated by a Member State in accordance with Article 11(1) of the MID

2 Scope

Gas meters placed on the market and/or put into use by the manufacturer need to satisfy the requirements of the MID.

It is for this particular reason that a conformity assessment procedure according to Annex B or H1 (design evaluation) is required to be carried out on the gas meter.

After a TEC for the gas meter has been issued the conformity assessment procedure has to be finished with a procedure according to Annex D, F in the case of Annex B or H1 (Quality system). During a conformity assessment procedure according to Annex D, F, or H1 (Quality system) the gas meter shall be fitted with a nameplate by the manufacturer.

For the benefit of manufacturers, and all other interested parties, e.g. Notified Bodies (designated under Annex B, D, F and H1 of the MID), notifying authorities and market surveillance authorities, this document describes a best practise approach relating to the information in the TEC, which is to be borne by and to accompany the gas meter.

This guide does not cover markings necessary under other relevant European Directives, such as but not limited to the ATEX directive, the EMC directive, the low-voltage directive and so on.

Utility companies can also require markings on the gas meters in order to facilitate the management of gas meters installed within the network. This guide does not deal with such markings.

This guide specifies the mandatory inscriptions as required by the MID and a best practise approach for specifying the information in the TEC, to be borne by and to accompany the gas meter that are considered necessary based on an interpretation of the essential requirements.

Alternative approaches may be acceptable, but the guidance provided in this document represents the collective and considered view of WELMEC as to the most appropriate practice to be followed.

3 Markings on the gas meter

According to article 17 of the MID the following markings shall be on the gas meter:

- CE mark + M + year of affixing + Number of NB

The marking shall be in accordance with the requirements mentioned in article 17 of the MID.

4 Required Information

4.1 Information on the gas meter:

According to article 9.1 of Annex I of the MID the following information shall be on the gas meter:

- Manufacturer's mark (logo) or name;
- Identity marking:
 - the type designation in accordance with the Type-examination or design certificate;
 - serial number
 - year of production
 - Number of the EC type examination certificate or the EC design examination certificate
- Information in respect of its accuracy:
 - Accuracy class
- Information in respect of the conditions of use
 - Gas temperature range and pressure range for which the errors of the gas meter shall be within the limits of the maximum permissible error, expressed as:

$$t_g = \dots - \dots \text{ <unit>; } ^{(1)}$$

$$p_g = \dots - \dots \text{ <unit>. } ^{(1)}$$
 - Maximum and minimum ambient temperature if different to gas temperature

$$t_m = \dots - \dots \text{ <unit>; } ^{(1)}$$
 - The density range, if applicable, within which the errors shall comply with the limits of the maximum permissible error may be indicated, and shall be expressed as:

$$\rho = \dots - \dots \text{ <unit> } ^{(1)}$$
 - Maximum and minimum flow rates Q_{\max} and Q_{\min} respectively
 - Transitional flow rate Q_t if not clearly stated in the applied harmonised standard, as indicated on the nameplate
 - If applicable the value of the output pulses
 - In case of indicating only the converted volume:
 - The specified temperature t_{sp}
 - The base temperature t_b
 - In case of indicating volume at base conditions:
 - The base temperature t_b
 - The base pressure p_b

¹ Alternatively, the markings could be made visible via the electronic indicating device in a clear and unambiguous manner provided that the TEC specifies how to obtain the values for these parameters, see 3.4 of this guide.

- In case of applying a fixed value for the pressure p_{sp}
 - V or H if the meter can be operated only in the vertical or horizontal position
 - Indication of the flow direction, e.g. an arrow symbol, if not included in the design
 - Additional markings for gas meters with output drive shafts
 - a. Gas meters fitted with output drive shafts or other facilities for operating detachable additional devices shall have each drive shaft or other facility characterized by an indication of its constant (C) in the form “1 rev = ... <unit>” and the direction of rotation. “rev” is the abbreviation of the word “revolution”;
 - b. If there is only one drive shaft the maximum permissible torque shall be marked in the form “ $M_{max} = \dots \text{ N.mm}$ ”;
 - c. If there are several drive shafts, each shaft shall be characterized by the letter M with a subscript in the form “ $M_1, M_2, \dots M_n$ ”;
 - d. The following formula shall appear on the gas meter:

$$k_1M_1 + k_2M_2 + \dots + k_nM_n \leq A \text{ N.mm},$$
 where:
 - A is the numerical value of the maximum permissible torque applied to the drive shaft with the highest constant, where the torque is applied only to this shaft; this shaft shall be characterized by the symbol M_1 ,
 - k_i ($i = 1, 2, \dots n$) is a numerical value determined as follows: $k_i = C_1 / C_i$,
 - M_i ($i = 1, 2, \dots n$) is the torque applied to the drive shaft characterized by the symbol M_i ,
 - C_i ($i = 1, 2, \dots n$) represents the constant for the drive shaft characterized by the symbol M_i .
 - Pulse values of HF and LF frequency outputs
(imp/<unit>, pul/<unit>, <unit>/imp); ⁽²⁾
- Note: The pulse value is given to at least six significant figures, unless it is equal to an integer multiple or decimal fraction of the used unit.*
- Additional markings for gas meters with electronic devices
 - a) For an external power supply: the nominal voltage and nominal frequency;
 - b) For a non-replaceable power source: the operational lifetime of the measuring device or, alternatively, the remaining battery capacity in units of time can be presented on the electronic indicating device; ⁽²⁾, see also 3.2 of this guide.
 - c) For a replaceable power source: see 3.2 of this guide.
 - d) Software identification: see 3.2 of this guide.
 - If information is needed for correct operation a hint to the meter manual or the pictogram of a manual shall be on the meter.

² Alternatively, this markings could be made visible via the electronic indicating device in a clear and unambiguous manner provided that the TEC specifies how to obtain the values for these parameters, see 3.4 of this guide.

According to Article 10.2 of Annex I of the MID the following information shall be near the display:

- Indication of V or m or the label “Volume” or “Mass” respectively in case of the display of volume or mass under measuring conditions, according to paragraph 2.1 of MI-002 of the MID.
- Indication of V_b or the label “Volume at base conditions” in case of converted volume.

According to Article 6 of Annex MI-002 of the MID the metered quantity shall be displayed in cubic meter, or in kilogram, which shall bear the relevant inscription or indication (either m³ or kg) such that it is adjacent to the least significant digit of the display. .

4.2 Information provided by the gas meter

- According to Article 8.3 of Annex I of the MID the software identification shall be easily provided by the measuring instrument³.
- According to Article 5.2 of MI-002 of the MID a dedicated power source shall have a lifetime of at least five years. After 90 % of its lifetime an appropriate warning shall be shown.

4.3 Information accompanying the gas meter

According to Article 9.3 of Annex I of the MID the instrument shall be accompanied by information on its operation, unless the simplicity of the measuring instrument makes this unnecessary.

Information shall be easily understandable and shall include where relevant:

- Mechanical and electromagnetic environment classes
- Upper and lower temperature limit
- Ability to withstand condensation
- Open or closed location
- Indoors or outdoors

³ See WELMEC guide 7.2 for guidance on the software identifier and check of conformity, i.e. checksum or hash code and the presentation of these results, in particular the instrument specific annexes (Extension I) of guide 7.2 for gas meters.

- Instruction for installation, maintenance, repairs, permissible adjustments
 - Battery replacement, battery type
 - Short description and instructions for consumers on method of obtaining the registered values that are used as a basis for the transaction and (if necessary) for checking the bill
- Instruction for correct operation and any special conditions of use
 - Gas family or characteristics of gas composition suitable for the meter
 - The suitability for an application with different gas and ambient temperatures
 - Requirements on installation.
 - If the meter is designed only to be installed in piping arrangements where only mild flow disturbances may occur, the length of the straight pipe line and any other information needed for the correct installation of the piping arrangements.
- Conditions for compatibility with interfaces, sub-assemblies or measuring instruments

According to Article 7.6 of Annex I of the MID a measuring instrument shall be designed so as to allow the control of the measuring tasks after the instrument has been placed on the market and put into use.

If necessary, special equipment or software for this control shall be provided by the manufacture

- The test procedure shall be described in the operation manual together with instruction for market surveillance organisations and for personal carrying out re-verification.

4.4 Information required by the TEC

The type-examination or design examination certificate can also specify information to be inscribed on the instrument or which has to be provided by the instrument, for example but not limited to:

- Transitional flow rate (may be in test mode provided the TEC describes how to get in the test mode)
- Software version number and checksum⁴ (may be in test mode provided the TEC describes how to get in the test mode)
- If applicable markings are presented via the electronic indicating device in a clear and unambiguous manner, the TEC should specify how to obtain the values for these parameters.

⁴ See WELMEC guide 7.2 for guidance on the software identifier and check of conformity, i.e. checksum or hash code and the presentation of these results, in particular the instrument specific annexes (Extension I) of guide 7.2 for gas meters.

5 Example of inscriptions

The notation "..." in the inscriptions of the parameters are given as an example.

Other notations are allowed if they are given by the MID., the harmonised standards, normative documents or WELMEC guides.

The notation t_m -25 ... 40 °C for example could also be

- t_m -25 °C / 40 °C or
- t_m -25 °C .. 40 °C or
- t_m -25 / 40 °C or
- any other notation given by the MID.

Instead of using indices to indicate subscript characters (for example the "m" sign as stated above), characters that are of a significantly lower size may be used.

5.1 Example name plate

Logo manufacturer			CE + M + year of affixing + Notified Body Number ⁵	
Type approval number			Other markings ⁶	EN 1359:1998 + A1:2006
Type	:	Xxxxxxxxx		t_m : -25 / 40 °C
Serial number	:	123456789		t_g : -20 / 40 °C
Production year	:	Yyyy		p_{max} : 500 mbar
Accuracy class	:	1,5		Q_{max} : 6 m ³ /h Q_{min} : 0,04 m ³ /h
Pulse value	:	0,01 m ³		
In the case of conversion to volume at base conditions				
t_{sp} : 20 °C	t_b : 15 °C	p_b : 1013,25 mbar	p_{sp} : 1035 mbar (see footnote ⁷)	

If information is needed for correct operation a hint to the meter manual or the pictogram manual shall be on the meter.

⁵ Could be more than one Notified Body number on the name plate if other Notified Bodies are involved for the conformity assessment procedure under other relevant directive, for example EMC – directive, ATEX directive and so on.

⁶ Other markings that are required under other applicable European Directives than the MID.

⁷ In case the conversion to volume at base conditions is done by using a fixed value for the assumed pressure, as an alternative this value may be shown on the display on request, as indicated in the manual

5.2 Examples of inscriptions or indications near or in the display

volume or mass at measuring conditions	Converted volume to base temperature.	Converted volume to base conditions in addition to volume at metering conditions
V if only the volume at metering conditions is indicated or m for mass	V_b together with t_b and/or t_{sp}	V_b together with P_b and t_b
immediately adjacent to the least significant digit of the display		
m^3 or kg	m^3	m^3