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Surveillance from first commissioning on measuring devices used in natural gas supply to the installations of the activities under the Directive 2003/87/EC establishing a scheme of CO_2 emissions trading

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National foreword

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TECHNICAL REPORT

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Surveillance from first commissioning on measuring devices used in natural gas supply to the installations of the activities under the Directive 2003/87/EC establishing a scheme of CO_2 emissions trading

Surveillance de la mise en service des appareils de mesure utilisés pour la fourniture de gaz naturel aux installations pour les activités sous la Directive 2003/87/CE établissant un schéma d'échange d'émissions de CO_2

This Technical Report was approved by CEN on 15 October 2012. It has been drawn up by the Technical Committee CEN/SS S12.

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Foreword

This document (CEN/TR 16478:2012) has been prepared by “CEN Sector Forum Gas Infrastructure”.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

The document C(2007) 3416 — COMMISSION DECISION of 18 July 2007 (2007/589/EC) establishing guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council [15] — will be used as common guidelines in the determination of the greenhouse gas emissions for all categories of activities listed in the Annex I of the Directive itself.

In the fifth paragraph of Clause 3, these guidelines establish that “It shall be ensured that the emission determination is systematically neither over nor under true emissions. Sources of uncertainties shall be identified and reduced as far as practicable. (…) All metering or other testing equipment used to report monitoring data shall be appropriately applied, maintained and calibrated, and checked.”

This Technical Report is intended to be used as a guideline in conjunction with the document C(2007) 3416 and to be applied to measuring instruments of natural gas measuring stations based on EN 1776, and possibly stand alone measuring instruments measuring the natural gas used in the categories of activities listed in the Annex I of the Directive 2003/87/EC.

Within the European Union, at the time of writing, there was no common guideline dealing with how to ensure an established difference of indication of a natural gas metering equipment in the use throughout their technical life. The associated risk: to manage the greenhouse gas emissions data declared by different Member States that are not completely comparable because of their determination by calculations based on consumption of natural gas data not homogeneous with regard to the reliability of the accuracy of their measurements.

The intent of this Technical Report is to give minimum provisions for surveillance in the use of natural gas measuring equipment in order to ensure compliance with an established difference of indication, leading to comparable greenhouse gas emissions data.

Furthermore, it is a proposal addressed to the Commission and the Member States to reflect on a consistent procedure that would enable an equivalent determination of the CO_2 amounts of emissions across the EU countries.

1 Scope

This Technical Report establishes minimum provisions for the surveillance, based on available standards from first commissioning, of devices and systems with measuring function throughout their technical life when used in the activities of the categories listed in the Annex I of the European Directive 2003/87/EC. It does so in order to ensure the compliance with the expected maximum allowable difference of indication.

This Technical Report applies to devices/systems with the function to measure:

— volumetric or mass amount of natural gas consumption (any type of gas meters),

— volumetric amount of natural gas consumption at specified base conditions (conversion devices),

— composition of natural gas (gas chromatographs),

for calculating, in accordance with the applicable provisions of the guidelines C(2007) 3416, the amount of the CO_2 emissions from the source stream of natural gas.

Users of this document should be aware that more detailed national recommendations/standards and/or codes of practice as well as national measures possibly approved by National Regulator may exist inside the EU Member States.

When national regulations have to be applied, this document should not be considered.

Except in the aforementioned case, this Technical Report is intended to be applied in association with applicable national recommendations/standards and/or codes of practice setting out the above mentioned surveillance provisions.

In the event of conflict in terms of different requirements in national regulations/standards and in the provisions of this document, the national regulations/standards will take precedence.

Referring to the aforesaid Commission's guidelines C(2007) 3416, SFG_I opts for the calculation based method to determine the amount of the CO_2 emissions.

Regarding commercially traded of natural gas, competent authorities may permit the determination of the annual gas consumption leading to evaluation of CO_2 emissions based solely on the invoiced amount of gas without further individual proof of associated uncertainties, provided that national legislation or the documented application of standards ensures that respective uncertainty requirements for activity data are met for commercial transactions (guidelines C(2007) 3416 -annex 1 §7).

Referring to 5.2 and to Chapter 16, annex 1 of guidelines C(2007) 3416, for installations with “de minimis” souce streams and with low emissions respectively, the provisions of this document can be waived.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE The pilot terms are listed in alphabetic order. The derived terms from a pilot term, if any, are listed in the appropriate order just after the relevant pilot term.

2.1
competent person
person who is trained, experienced and approved to perform measuring surveillance activities

[SOURCE: EN 12186:2000, modified]

2.2
difference of indication
difference between the indicated value V_m of a device with measuring function and the one of a reference instrument V_r for a specific operating datum of the same measurand expressed as percentage of the value measured by the reference instrument:

$$D = \frac{V_m - V_r}{V_r} \times 100$$

2.3
maximum allowable difference
maximum absolute value of the difference of indication

2.4
measuring device
measuring instrument capable of measuring a process datum (e.g. gas meters, pressure transducer, pressure indicator, temperature transducer, etc.)

2.5
measuring systems
assembly of several measuring devices capable of measuring a process datum via several other process data (e.g. a gas meter + pressure and temperature transducer + conversion device)

[SOURCE: MID, Directive 2004/22/EC of the European Parliament and the Council of 31 March 2004 on measuring instruments]

2.6
recalibration
activities consisting of the verification that the differences of indication of a device with measuring function are within the limits specified in the relevant standard and re-alignment of the indication when needed

2.7
self-diagnostic
mean, e.g. software, capable of warning when the measuring device/system is not operating properly

2.8
self-recalibration
recalibration activity carried out automatically by the measuring device itself, e.g. gas chromatograph

2.9
significant parameter
measurable characteristic involved in the measuring process (of the measuring devices/system) which, in case of drift out from pre-established limits, may imply errors of the measuring process

Note 1 to entry: For example, when in an ultrasonic gas meter, the transient times reflect a significant different speed of sound for one of the paths compared with the average speed of all paths.

Note 2 to entry: This document considers following limits for significant parameter:

— **normal thresholds:** the maximum and/or minimum values of a significant parameter identified in the type test of a measuring device/system for normal operating conditions; when these limits are met it is presumed that the necessary conditions for proper measurements occur;

— **care thresholds:** values of a significant parameter still ensuring proper measurement but signalling the risk that the significant parameter may further drift and reach the alarm level;

— **alarm thresholds:** values of a significant parameter that imply inacceptable differences of indication of the measuring process and that, when they occur, require the activation of corrective actions to reestablish the necessary conditions under which it is presumed that proper measurement process occurs.

2.10
Gas Measuring System Operator (GMSO)
natural or legal person who is responsible for the operation and maintenance of the measuring system

2.11
warnings
visible/perceptible signal indicating that malfunctions have occurred in the measuring device/system

3 Surveillance

3.1 General

All those activities carried out from the first commissioning of measuring devices/systems throughout their technical life until the last de-commissioning aimed at ensuring that the differences of indication during the operating life are not higher than the maximum allowable difference.

3.2 Activities of the surveillance for conversion devices, gas chromatographs and gas meters

The activities of the surveillance should include:

a) first commissioning;

b) specific activities related to warnings from self-diagnostic means only where applicable;

c) periodical activities:

   1) visual inspection, and

   2) verification, and

   3) re-lubrication where requested as per the relevant maintenance manual.

d) recalibration applicable only to gas chromatograph; periodical recalibration applicable to gas meters and converters;

e) periodical monitoring of the difference of indication and, when needed, subsequent recalibration (not applicable to gas chromatograph).

The Gas Measuring System Operator fulfilling activities d) does not need to consider the activities e).

3.3 Planning of surveillance

3.3.1 General

The stability during operation of the metrological performance depends on both the measuring equipment and the operating conditions. When establishing the surveillance policy, the following should be considered:

a) the specific composition of fuel gas;

b) the specific location and layout of the measuring system (e.g. redundancy of measuring devices);

c) the reliability of the historical measured-performance data;

d) the measuring-reliability of the stations;

e) the impact of the difference of indication on the involved parties (e.g. global amount of measured gas, uncertainty thresholds requested by the document C(2007) 3416, etc.);

f) the need for the continuity of the gas supply, the presence of the auto-diagnosis function;

g) any other elements that may affect the measuring-performances of any measuring devices/systems.

For the surveillance activities on devices/systems with measuring controls, it should be considered that:

h) the first commissioning takes place only at initial start up of a single new measuring device/system/stations,

i) the periodical monitoring of the difference of indication should be followed by a subsequent recalibration only when needed as described in 3.5.2, and

j) the advantage to combine, for each intervention at site, surveillance activities for other equipment of the same installation.

3.3.2 First commissioning

The first commissioning should be carried out in accordance with:

— national regulations/standards where available,

— codes of practices of the Gas Measuring System Operator (GMSO),

but at least according to this guideline in case of lack of national regulations/standards or codes of practice.

The task of first commissioning should include following verifications:

— the conformity of installation with the applicable prescriptions;

— compliance with MID or national standards for meters, converters and other measuring devices where applicable (markings and integrity of the seals);

— a self calibration of gas chromatographs (followed by self-recalibrations which take place periodically);

— the availability of the relevant user's manual and test certificate according to relevant standard.

3.3.3 Specific activities related to warnings from, self-diagnostic means

Where measuring devices and/or systems provide specific warnings, in case of their activation the recommended actions detailed in the relevant user’s manual should be implemented within due time in accordance with the provisions in force.

3.3.4 Periodical visual inspection/verification/re-lubrication

The periodical specific visual inspections/verifications/re-lubrication activities are usually listed and described in the concerned use/maintenance manual.

In general, these activities should be carried out in the period between two consecutive recalibrations and/or monitoring of the difference of indication. The activities listed in Table 1 should be selected by the operator, where applicable.

Table 1 — Periodical visual inspection/verification and maintenance (meters + converters) [1)]

Description of the activities	Equipment concerned	Acceptance criteria
Visual inspection of external conditions of indicating device	All measuring devices	No visible damages, Readable over operating temperature range
		External Surface protection in normal conditions
		No any abnormal corrosion
Noise emissions	Measuring devices with mobile parts (e.g. turbine gas meters)	No any emission of abnormal noise
Verification of: ➢ cleaning, ➢ external aspect and ➢ dimensions of orifice plate and other internal parts	Orifice meters	As per the relevant standard and user's manual
Maintenance activities (e.g. lubrication and re-lubrication) as listed in the user's manual	Those measuring devices for which the use/maintenance manual specifies the need of periodical re-lubrication	As per relevant use/maintenance manual

3.4 Recalibration for gas chromatograph

3.4.1 General

The gas chromatograph is a measuring device that can undertake self-recalibration at periodical intervals or can be calibrated regularly.

For this equipment, the self-recalibration or regular calibration together with the activities outlined in a), b) and c) of 3.2 should be sufficient to ensure that the specified metrological performances are met.

3.4.2 Specific requirements for surveillance

The planning of surveillance should consider:

a) The frequency of self recalibration should be established on the basis of:

   1) national regulations/standards where available,

   2) code(s) of practice of Gas Measuring System Operator,

but at least according to this guideline in case of lack of national regulations/standards.

b) The above approach should evaluate following pre-conditions:

   1) the installation conditions (temperature, protection, etc.) of the bottles of gas samples should be carried out as per the recommendations listed in the relevant installation manual;

1) The applicable activities to be complied with should be selected by the operator.

2) the replacement of the bottles of gas samples should be done as per the recommendations listed in the installation manual; the composition of the gas sample should be certified by an accredited test laboratory;

3) the electronic memory of gas chromatograph should give evidence of an appropriated number of last automatic self-recalibration carried out (e.g. 10 last self-recalibrations) as well as the relevant errors of indication based on a statistical data collection. All these historical data should be periodically examined by a competent person to evaluate whether there is a need to introduce corrective actions aimed to ensure the expected reliability of the metrological performance.

c) Furthermore, it shall be noted that the examination of historical data should comply with national regulations/standards where available.

3.5 Specific surveillance activities on gas meters and on gas converters

3.5.1 Periodical recalibration

3.5.1.1 General

Gas Measuring System Operators carrying out the surveillance on gas meters and on converters according to the method described in this subclause would not need to consider the method of surveillance described in 3.5.2.

The method of recalibration should be that followed for calibration as per the relevant standard.

The minimum frequency should be established on the basis of:

— national regulations/standards where available,

— codes of practice of the Gas Measuring System Operator (GMSO) in case of lack of national regulations/standards but at least on the basis of the frequencies showed in Table 2 of this guideline.

3.5.1.2 Specific conditions for a decreasing of the frequency of periodical recalibrations for gas meters equipped with self-diagnostic means

Where the gas meters are equipped with self-diagnostic means and the periodical recalibration method has been chosen for the surveillance in use, the Gas Measuring System Operator can prolong the pre-established period of time between two subsequent recalibrations if the self-diagnostic function is capable of detecting care threshold and alarm threshold for significant parameters.

Some gas meters, e.g. the ultrasonic and Coriolis gas meters, are equipped with self-diagnostic software capable of warning when the necessary conditions for proper measurement are not met. These conditions are often identified by limiting minimum and maximum values for certain diagnostic functions or parameters. Practically, the warning consists of alarms that indicate when some significant measuring parameters are outside the identified limits.

For example, in the ultrasonic meters it is very common to introduce some limits for the differences of the various speeds of sound calculated for each path from the average speed of sound of all paths. In other words, when these limits are exceeded, the cause (dirty, fault, etc.) should be traced and investigated and appropriate corrective actions implemented.

The self-diagnostic function can detect following two different warnings for a significant measuring parameter:

— a care threshold (e.g. yellow light) or

— an alarm threshold (e.g. red light).

Generally, the alarm threshold warns that the limits of the concerned significant measuring parameter have been exceeded and the care threshold warns that it is expected that the limits of the concerned significant measuring parameter will be exceeded.

When thresholds are exceeded, the following actions should be taken:

— in case of care threshold: an investigation by a competent person into the cause of the drift from starting normal conditions for proper measurements; relevant corrective actions should be implemented within appropriate time;

— in the case of alarm threshold: an investigation by a competent person into the cause of the deviation from necessary conditions for proper measurements and, consequently, the necessary intervention (e.g. cleaning of transducer faces in ultrasonic meters) to re-establish adequate operating conditions.

3.5.2 Periodical monitoring of the difference of indication of gas meters

3.5.2.1 General

This type of surveillance activity should be considered as an alternative to the surveillance activity described in 3.5.1.

This method, as alternative to periodical recalibration, is based on the periodical verification at field of the difference of indication of the measuring device/system and subsequent recalibration where the historical trend of the difference of indication data reveals that it should be expected that the pre-established metrological performances will not be met.

The periodical verification of the difference of indication may be carried out either for the end-output data of the measuring chain (e.g. output data of gas-volume of an electronic conversion device part of a measuring chain including a gas meter, pressure and temperature transducers) and/or for single unit of the measuring chain (e.g. gas meter, pressure transducer, etc.). In this second event, the periodical verification of the difference of indication should involve at least those single units whose malfunction may affect the end-output measuring data.

The practical method to verify the difference of indication may be for example:

— measuring of the same datum by two different independent meters (e.g. two gas meters in series for the same flowing gas);

— any other suitable method capable to quantify the difference of indications of gas meter under verification for one or more operating conditions within the normal operating range.

The reference instrument may be based on measurement of flow in closed conduits by tracer (dilution or transit time methods according to the principles of ISO 2975-1).

One of the methods described in 3.5.2.2 and 3.5.3 can be chosen by the Gas Measuring System Operator.

3.5.2.2 Measuring of the same datum at the same time by two different independent gas meters

3.5.2.2.1 Monitoring of two gas meters with same or slightly different measurement ranges connected in-series

This method practically consists of comparing the two values of the same datum measured by two different gas meters at the same time. At least two couples of measured values within the normal operating range of both meters should be compared.

The two gas meters may be of differing technologies and may have slightly different full scales. However, in this last case, it is necessary to have suitable overlapping of operating ranges in such a way so as to be able to compare two couples of measured values of the same datum.

Where the operating conditions of the installation do not allow carrying out the tests consequently, it is recommended to take the measured values of the two couples within a 24 h period.

EXAMPLE

This method should include the following steps:

— the measuring of the concerned processing datum by the two different gas meters;

— calculation of the deviation between of the two measured values by:

$$D_{mi} = \frac{|M_{1i} - M_{2i}|}{M_{1i} + M_{2i}} \times 200$$

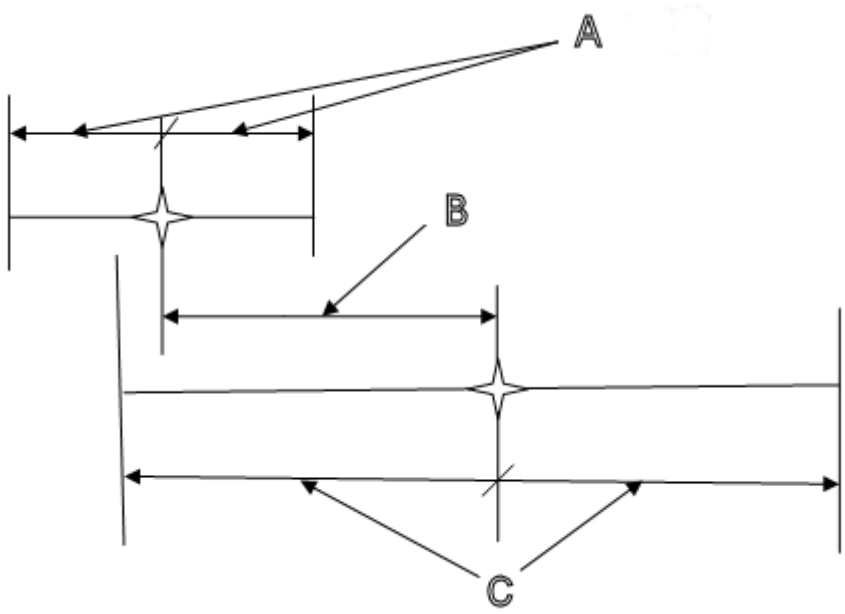
where

D_{mi} = deviation of the two measured value as % of the average measured value;

M_{1i} = measured value by 1st gas meter at the test "i";

M_{2i} = measured value by 2nd gas meter at the test "i".

When for one or both couples of the two measured values the deviation differs more than the highest maximum allowable difference of the two concerned gas meters or exceeds the value fixed by the Gas Measuring System Operator according to its experience, a recalibration within appropriate time should be planned. The following scheme shows the overlapping of the maximum allowable difference of the two gas meters.



Key

A maximum allowable difference first gas meter
B difference between two measured values permissible error first instrument
C maximum allowable difference second gas meter instrument
✦ measured values M_{1i} and M_{2i} at the test "i"

Figure 1 — Scheme of the maximum allowable difference between two gas meters

3.5.2.2.2 Monitoring of two gas meters with widely different measurement ranges connected in-series

This method practically consists of comparing the values of the same flow measured by a larger gas meter and those measured by a smaller gas meter (e.g. larger gas meter used normally in winter period and the smaller gas meter used normally in summer period) in the overlapping operating range that, for both gas meters should be $> Q_t$[2)] (transitional flow) and $< Q_{max}$[3)] (maximum flow). In this case, it should be sufficient to compare the measured values of the two gas meters only for one operating condition.

In the above case when the deviation of two readings calculated as detailed in the previous subclause is higher than a value fixed by the Gas Measuring System Operator according to its experience (e.g. 75% of the highest maximum allowable difference of the two measuring devices), a recalibration activity of both gas meters within appropriate time should be planned (see also Figure 1).

3.5.3 Monitoring of the changing of the difference of indication of gas meters during operation

This method is applicable to any gas meter and consists in a periodical monitoring of the difference of indication without dismantling the gas meter from the inlet/outlet pipework.

One of the following methods can be chosen by the Gas Measuring System Operator.

a) Method A: examination of the trend over time of the weighted mean difference of indication

Verification would include, at least, tests for two different values of flow rate. The two different flow rates should be chosen in the range:

1) from Qt[4)] to 40% of Qmax[5)] and

2) from 60% to 100% of Qmax

of the gas meter under monitoring.

Where the operating conditions of the installation do not allow carrying out the tests subsequently, it is recommended to pick up the measured values for the two flow rates within a 24 h period.

The difference of indication for the verifications carried out at above specified flow rates should be calculated with:

$$D_i = \frac{\left|Q_{mi} - Q_{ri}\right|}{Q_{ri}} \times 100$$

where

D_i = difference of indication referred to measured flow rate Q_{mi};

Q_{mi} = measured flow rate by the gas meter under monitoring at the test “i”;

Q_{ri} = measured flow rate by the reference measuring system at the test “i”.

---

2) As per relevant standard.

3) As per relevant standard.

4) As per relevant standard.

5) As per relevant standard.

For each couple of tests carried out for two different values of flow rates, the weighted mean difference of indication (WMDI) is calculated with:

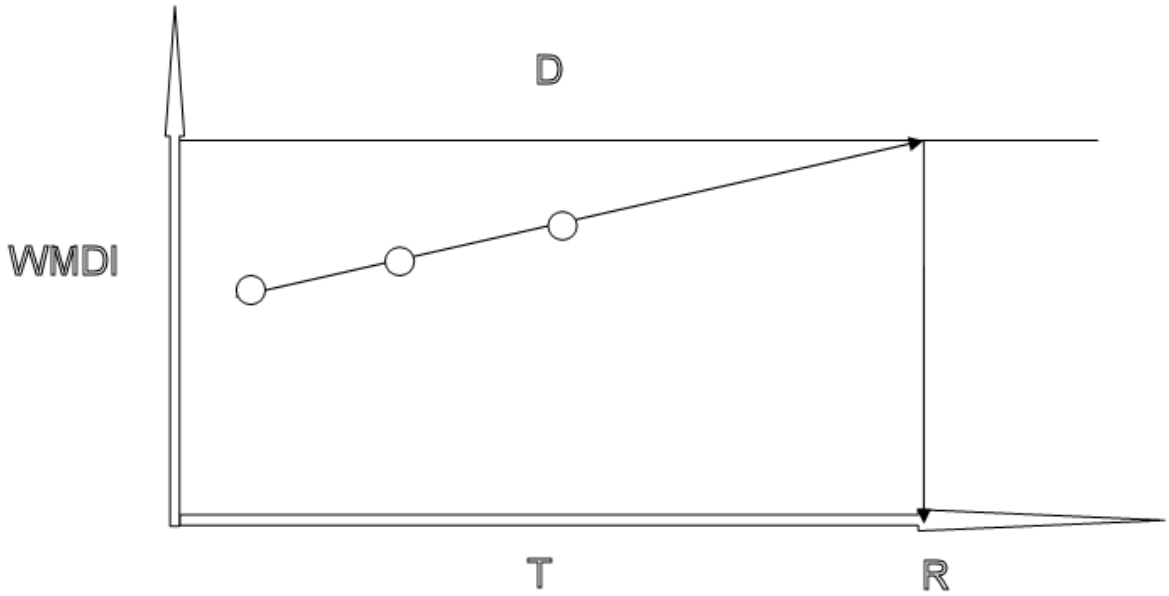
$$D_{wm} = \frac{\sum_{1}^{2} \frac{Q_{mi}}{Q_{\max}} \times D_i}{\sum_{1}^{2} \frac{Q_{mi}}{Q_{\max}}}$$

where

D_{wm} = value of the weighted mean difference of indication (WMDI).

The frequency of the verification of the weighted mean difference of indication should be at least yearly.

When the trend of weighted mean difference of indication (D_{wm}) for the subsequent period based on the trend of historical data (at least three) reaches a deterioration equal to the maximum allowable difference (see following scheme), a recalibration activity within appropriate time should be planned.



Key

D	maximum allowable difference
WMDI	weighted mean difference of indication
T	time
R	recalibration
◯	weighted mean difference of indication D_{wm}

Figure 2 — Scheme of the trend of weighted mean difference of indication before recalibration

Where the historical consumption data (data logger) give evidence that the gas meter is significantly used also with flow rate < Q_t the tests would include also a test with a flow rate from Q_{min}[6)] to Q_t.

6) Minimum flow rate as per the relevant standard.

In this case the difference of indication is calculated by:

$$D_{lf} = \frac{\left|Q_{mlf} - Q_{rlf}\right|}{Q_{rlf}} \times 100$$

where

Q_{mlf} measured flow rate by the gas meter under monitoring;

Q_{rlf} measured flow rate by the reference measuring system.

The trend of this difference of indication in the time should be evaluated as above taking into consideration its relevant maximum allowable difference value. A recalibration should be planned at the earliest time deduced from the two trends, whichever is the nearest.

b) Method B: Monitoring of the changing of the difference of indication of gas meters compared with the one determined at or subsequently to the first commissioning

1) the first verification should be carried out at/or subsequently to the first commissioning;

2) the frequency of the periodical monitoring should be yearly;

3) the difference between the periodically determined difference of indication and its value determined according to a) shall not exceed half of the maximum allowable difference.

This method should be carried out at appropriated flow rates as established/specified by the Gas Measuring System Operator.

4 Proposal for a European scheme related to common provisions and limit values

4.1 General

This clause is addressed to the competent services of the EU Commission (e.g. DG Environment) and the Member States for them to take into account the specific measurement and calculation methods in practice in the gas sector in case the existing guidelines "C(2007) 3416- Commission Decision of 18 July 2007" were to be completed on a sector basis.

The recommendations below serve the purpose of standardized procedures for all EU countries in order to ensure comparable results of CO_2 amounts and consequently a fair competition when trading the certificates.

The enclosed annex of the national situations displays the differences across the EU countries and justifies the need for such a document.

4.2 Summary of requirements for surveillance on metrological performance

The following Table 2 summarises:

— the minimum and maximum frequency of periodical recalibration in accordance with available national regulations/standards,

— recommended minimum provisions for the surveillance in use on metrological performance in case of lack of other applicable provisions.

Table 2 — Summary of national practices for surveillance of the devices with a measuring function

Type of device or system	Type of surveillance						
	Self recalibration	Validity of certificate of composition of the gas samples [a]	Range of frequencies of periodical recalibrations in accordance with the practices (national regulations/ standards, GMSO specifications) [b]		Periodical monitoring of the difference of indication	Periodical visual inspection/ verification/re-lubrication	Periodical examination of historical metrological data
			from	to	Minimum frequency		
Gas chromatograph	3 months	3 years	1 month	1 year	Not applicable	As per the user's manual	3 months
Rotor gas meter	Not applicable	Not applicable	5 years	10 years	yearly		Not applicable
Turbine gas meter			2 [c] years	8 years			
Orifice meter			1 year	5 years		1 year and as per user's manual [d]	
Vortex meter			5 years	5 years		As per the user's manual	
Ultrasonic gas meter			4 years	5 years			
Coriolis meter			2 years	5 years			
Conversion device			6 months	5 years			

[a] Composition of gas samples certified by a laboratory accredited as per EN ISO/IEC 17025..
[b] For more details see Annex A – some countries do not conduct any recalibration.
[c] Q > 600 nm^3/h.
[d] At least orifice plate.

Annex A
(informative)

National Situations regarding Devices Measuring the Supply of Gas Natural for the Activities Listed in Annex 1 of ETD

A.1 BELGIUM (devices in own Fluxys'Emission Trading Sites)

Table A.1.1 — Meters

Type of device or system	Type of surveillance		
	Periodical recalibration or realignment	Periodical monitoring of the difference of indication	Periodical visual inspection/verification /re-lubrication
	Minimum Frequency		
Rotor meter	No recalibration [a]	n.a.	1/month
Turbine meter	No recalibration [a]	Yearly	1/month
Orifice meter	n.a.	n.a.	n.a.
Vortex meter	n.a.	n.a.	n.a.
Ultrasonic meter	n.a.	n.a.	n.a.
Coriolis meter	n.a.	n.a.	n.a.

[a] Legal metrological provision: 1% accuracy of meter at commissioning. No legal metrological provisions with regard to recalibration.

Table A.1.2 — Conversion Device

Type of device or system	**Type of surveillance**		
	Periodical recalibration or realignment	**Periodical monitoring of the difference of indication**	**Periodical visual inspection/verification/re-lubrication**
	Minimum Frequency		
Conversion Device	Yearly (inspection; intervention by manufacturer if needed)	Yearly	Yearly

Table A.1.3 — Chromatographs

Type of device or system	**Type of surveillance**				
	Self recalibration	**Validity of certificate of composition of the gas samples**	**Periodical recalibration or realignment**	**Periodical visual inspection/verification/re-lubrication**	**Periodical examination of historical metrological data**
	Minimum Frequency				
Gas chromatograph	n.a.	3 years	yearly	yearly	yearly

A.2 GERMANY

Table A.2.1 — Meters

Type of device or system	Type of surveillance		
	Periodical recalibration or realignment	**Periodical monitoring of the difference of indication**	**Periodical visual inspection/ verification/re-lubrication**
	Minimum Frequency		
Turbine meter	without lubricator 8 years	yearly	lubricator max. 4000 ³/h 12 years lubricator max. 16,000 m³/h 16 years

Table A.2.2 — Conversion Device

Type of device or system	Type of surveillance		
	Periodical recalibration or realignment	**Periodical monitoring of the difference of indication**	**Periodical visual inspection/ verification/re-lubrication**
	Minimum Frequency		
Conversion Device	5 years, recurrent extension for another year if yearly verified by authorised bodies	yearly	5 years, recurrent extension for another year if yearly verified by authorised bodies

Table A.2.3 — Chromatographs

Type of device or system	Type of surveillance				
	Self recalibration	Validity of certificate of composition of the gas samples	Periodical recalibration or realignment	Periodical visual inspection/verification/re-lubrication	Periodical examination of historical metrological data
	Minimum Frequency				
Gas chromatograph	1 week	3 years	yearly	yearly	n./a.

A.3 SPAIN

Table A.3.1 — Meters

Type of device or system	Type of surveillance		
	Periodical recalibration or realignment	**Periodical monitoring of the difference of indication**	**Periodical visual inspection / verification / re-lubrication**
	Minimum Frequency		
Rotor meter	N.A. in Enagas/ 6 years for distribution companies		
Turbine meter	6 years[a]	1-6 months/12 months	6 months/12 months
Orifice meter	N.A in Enagas		
Vortex meter	N.A in Enagas		
Ultrasonic meter	Not regulated [b]	1-6 months	1-6 months
Coriolis meter	Following manufacturer recommendations. Used in Enagas only for Fuelgas in C.S. and LNG Regasification Plants		

[a] It shall be four years for meters not installed in delivery stations from Transmission Company to Distribution Company (Legal requirement).

If Consuption > 30 GWh/year (or 600m3 (n)/h): **Turbine-flow meters:** six years **if it is possible in the installation to carry out series tests. If the design of the installation does not allow it, every two years.** Calibration certificates from laboratories accredited as per EN ISO/IEC 17025 (Legal requirement).

In red: Enagas internal requirement. In all turbines meters in Enagas (Gas Transmission delivery stations) are carried out series test every six months if the flow is > 20 %.
Qmax. In international metering stations the frecuency could be one to three months.

[b] Periodical verification “in situ”. Continuous monitoring in international metering stations. Recalibration only in case of malfunction and agreed between companies.

Table A.3.2 — Conversion Device

Type of device or system	Type of surveillance		
	Periodical recalibration or realignment	Periodical monitoring of the difference of indication	Periodical visual inspection/ verification/re-lubrication
	Minimum Frequency		
Conversion Device	6 months	6 months	6 months

Table A.3.3 — Chromatographs

Type of device or system	Type of surveillance				
	Self recalibration	Validity of certificate of composition of the gas samples	Periodical recalibration or realignment	Periodical visual inspection/ verification/re-lubrication	Periodical examination of historical metrological data
	Minimum Frequency				
Gas chromatograph	1 day	2 years	1 year	1 year	
* Calibration certificate from a laboratory accredited as per EN ISO/IEC 17025.					

A.4 FRANCE

Table A.4.1 — Meters

Type of device or system	Type of surveillance		
	Periodical recalibration or realignment	**Periodical monitoring of the difference of indication**	**Periodical visual inspection/ verification/ re-lubrication**
	Minimum Frequency		
Rotor meter	5 years		Lubrification 1 year/ visual inspection 1 month
Turbine meter	5 years		Lubrification 1 year/ visual inspection 1 month
Orifice meter	1 year		1 year
Vortex meter	No vortex		
Ultrasonic meter	5 years	1 year	
Coriolis meter	No Coriolis		

Table A.4.2 — Conversion Device

Type of device or system	Type of surveillance		
	Periodical recalibration or realignment	Periodical monitoring of the difference of indication	Periodical visual inspection / verification / re-lubrication
	Minimum Frequency		
Conversion Device	1 year		Non applicable!

Table A.4.3 — Chromatographs

Type of device or system	Type of surveillance				
	Self recalibration	Validity of certificate of composition of the gas samples	Periodical recalibration or realignment	Periodical visual inspection/ verification/re-lubrication	Periodical examination of historical metrological data
	Minimum Frequency				
Gas chromatograph	1 week (if applicable)	2 years	1 year	6 month	Not applicable

A.5 GREECE

Table A.5.1 — Meters

Type of device or system	Type of surveillance		
	Periodical recalibration or realignment	**Periodical monitoring of the difference of indication**	**Periodical visual inspection / verification / re-lubrication**
	Minimum Frequency		
Rotor meter	EVERY 8 YEARS	ANNUALLY for major gas customers – EVERY 2 YEARS for minor gas customers	ANNUALLY for major gas customers – EVERY 2 YEARS for minor gas customers
Turbine meter	EVERY 5 YEARS	EVERY 6 MONTHS	EVERY 6 MONTHS
Orifice meter	ANNUALLY	EVERY 3-4 MONTHS or EVERY 1 MONTH	EVERY 3-4 MONTHS or EVERY 1 MONTH
Vortex meter	NOT APPLICABLE IN DESFA		
Ultrasonic meter	EVERY 5 YEARS	ANNUALLY	ANNUALLY
Coriolis meter	EVERY 2 YEARS APPLICABLE only for Compressed Natural Gas Stations	EVERY WEEK as per ISO 10790	EVERY WEEK as per ISO 10790

Table A.5.2 — Conversion Device

Type of device or system	Type of surveillance		
	Periodical recalibration or realignment	**Periodical monitoring of the difference of indication**	**Periodical visual inspection / verification / re-lubrication**
	Minimum Frequency		
Conversion Device: FLOW COMPUTER	EVERY 6 MONTHS	NO ERROR	
Conversion Device: PTZ CORRECTOR	ANNUALLY for major industrial gas customers – EVERY 3 YEARS for minor industrial gas customers		

Table A.5.3 —Chromatographs

Type of device or system	Type of surveillance				
	Self recalibration	**Validity of certificate of composition of the gas samples**	**Periodical recalibration or realignment**	**Periodical visual inspection/verification/re-lubrication**	**Periodical examination of historical metrological data**
	Minimum Frequency				
Gas chromatograph	DAILY OR WEEKLY	EVERY 3 YEARS from Laboratory Accredited as per EN ISO/IEC 17025	MONTHLY MANUAL calibration & performance evaluation test every week for electrical power producing customers	MONTHLY	MONTHLY

A.6 ITALY

Table A.6.1 — Meters

Type of device or system	Type of surveillance					
	Periodical recalibration or realignment		Periodical monitoring of the difference of indication		Periodical visual inspection/verification/re-lubrication	
	Minimum Frequency					
	Metrological provisions [a]	Provisions related to devices under ETD [b]	Metrological provisions [a]	Provisions related to devices under ETD [b]	Metrological provisions [a]	Provisions related to devices under ETD [b]
Rotor meter	10 years for equipment as per Annex MI-002 of MID	10 years	No provisions	As per the evaluations (to be proved) by the GMSO of the measurement devices	No provisions	1 year: level of lubricant/etc.
Turbine meter	10 years for equipment as per Annex MI-002 of MID	5 years	No provisions		No provisions	➢ 1 year: visual inspection/etc. ➢ 3 months: re-lubrication
Orifice meter	No provisions	➢ 1 year: P/T transmitter ➢ 5 years: orifice plate	No provisions		No provisions	1 year: visual inspection of orifice plate/ maintenance/etc.
Vortex meter	5 years for equipment as per MI-002 of MID	5 years	No provisions		No provisions	1 year: visual inspection sensors/bluff body, wall corrosion/maintenance/etc.
Ultrasonic meter	5 years for equipment as per MI-002 of MID	5 years	No provisions		No provisions	1 year: visual inspection sensors/wall corrosion/maintenance/maintenance/etc
Coriolis meter	5 years for equipment as per MI-002 of MID	5 years	No provisions		No provisions	➢ 1 month: check of the adjusting of zero point ➢ 1 year: visual inspect. sensors /corrosion abrasion/ maintenance/etc.

[a] The law 20th Nov. 2009, n. 166, in particular:

- specifies that the legal metrology provisions do not apply to the measuring of gas at the interconnections between transmission and distribution grid and to other cases different from final users (e.g. interconnections at storage facilities),
- announces other decrees dealing with the in-use surveillance both for the **legal measurement** of gas at final users (e.g. industries) supplied by the transmission grid and for the measurement of gas at the above interconnections.

PS - The draft decree on "in- use verifications" of MID gas measuring devices, installed in measuring stations under the field of **application of legal metrology** has been published as decree of MINISTERO DELLO SVILUPPO ECONOMICO 16 April 2012, n. 75. The draft decree on "in-use verification" of measuring device at the above interconnections not subjected to legal metrology has been announced by the Minister of Economical Development in the decree of 18 June 2010.

[b] Deliberation 14/90 and practical guideline - version 1.2 – May 2009 of Ministero dell'Ambiente e della Tutela del Territorio e dal Mare (not applicable to low emission installations and to "de minimis source streams".

Table A.6.2 — Conversion Device

Type of device or system	Type of surveillance					
	Periodical recalibration or realignment		Periodical monitoring of the difference of indication		Periodical visual inspection/verification/re-lubrication	
	Minimum Frequency					
	Metrological provisions [a]	Provisions related to devices under ETD [b]	Metrological provisions [a]	Provisions related to devices under ETD [b]	Metrological provisions [a]	Provisions related to devices under ETD [b]
Conversion Device	2 years (type 1) or 4 years (type 2) for equipment as per Annex MI-002 of MID: P/T transmitters[c]	4 years	No provisions	As per the evaluations (to be proved) by the GMSO of the measurement devices	No provisions	1 year: maintenance & check
	2 years for other equipment: P/T transmitters[c]					

[a] The law 20th Nov. 2009, n. 166, in particular:

- specifies that the legal metrology provisions **do not apply** to measuring of gas at the interconnections between transmission and distribution grids and to other cases different from final users (e.g. interconnections at storage facilities),
- announces other decrees dealing with in-use surveillance both for the **legal measurement** of gas at final users (e.g. industries) supplied by the transmission grid and for the **not legal measurement** of gas at the above interconnections.

PS - The decree on “in- use verifications” of MID gas measuring devices, installed in measuring stations under the field of **application of legal metrology** has been published as decree of MINISTERO DELLO SVILUPPO ECONOMICO 16 April 2012, n. 75. The draft decree on “in-use verification” of measuring device at the above interconnections not subjected to legal metrology has been announced by the Minister of Economical Development in the decree of 18 June 2010.

[b] Deliberation 14/90 and practical guideline - version 1.2 – May 2009 of the Ministero dell’Ambiente e della Tutela del Territorio e dal Mare (not applicable to low emission installations and to “de minimis source streams”.

[c] For conversion devices installed in measurement station subject to legal metrology.

Table A.6.3 — Chromatographs

Type of device or system	Type of surveillance									
	Self recalibration		Validity of certificate of composition of the gas samples		Periodical recalibration or realignment		Periodical visual inspection / verification / re-lubrication		Periodical examination of historical metrological data	
	Minimum frequency									
	Legal metrological provisions	Provisions related to devices under ETD [b]	Legal metrological provisions	Provisions related to devices under ETD [b]	Legal metrological provisions	Provisions related to devices under ETD [b]	Legal metrological provisions	Provisions related to devices under ETD [b]	Legal metrological provisions	Provisions related to devices under ETD [b]
Gas chromatograph	No provisions [a]	No provisions	No provisions [a]	No provisions	No provisions [a]	To be established and declared by the GMSO	No provisions [a]	No provisions	No provisions [a]	No provisions

[a] Surveillance in use as per the code of practice of Gas Measuring System Operator approved by the National Regulator. The requirements on the surveillance in use will be implemented by CIG (Italian Gas Committee) in the next edition of Italian Standard UNI 9571 (cited by the Decree of 16 April 2008).

[b] Deliberation 14/90 of the Ministero dell'Ambiente e della Tutela del Territorio e dal Mare (provisions not applicable to equipment under the code of practice of Gas Measuring System Operator approved by the National Regulator.

A.7 SLOVAKIA

Table A.7.1 — Meters

	Recalibration		Comments
	Frequency	**Accuracy**	
SK	1. Meters Turbine flow meters – 5 years 2. Converters 5 years	1. Meters – 1 % 2. Converters – 0.1 %-0.25 %	

Table A.7.2 — Chromatographs

	1st Commisioning Requirements (methods, accuracy, net/gross cal val.)	**Emission Factor**	**Type of Requirements Legal/ Gas Company (accreditation) Carried out by:**	**Periodic Surveillance/Monitoring - Requirements**
SK	Uncertainty of GCV – 0,25 % (legislative requirement)		Calculation of calorific values, density, relative density, and Wobbe index from composition in accordance with **EN ISO 6976** Online gas chromatograph system in accordance with **EN ISO 9001:2008** – *certification in progress* Calibration of chromatographs and certification of the gas samples carried out by accredited laboratory in acordance with **EN ISO/IEC 17025**	Self calibration - every 24 hours Validity of certificate of composition of the gas samples – 2 years Calibration of chromatographs by accredited laboratory - yearly

Bibliography

[1] EN 1359, *Gas meters — Diaphragm gas meters*

[2] EN 1776, *Gas supply systems — Natural gas measuring stations — Functional requirements*

[3] EN 12186:2000, *Gas supply systems — Gas pressure regulating stations for transmission and distribution — Functional requirements*

[4] EN 12261, *Gas meters — Turbine gas meters*

[5] EN 12405-1, *Gas meters — Conversion devices — Part 1: Volume conversion*

[6] EN 12480, *Gas meters — Rotary displacement gas meters*

[7] EN ISO 5167-1:2003, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 1: General priciples and requirements (ISO 5167-1:2003)*

[8] EN ISO 6976, *Natural gas — Calculation of calorific values, density, relative density and Wobbe index from composition (ISO 6976)*

[9] EN ISO 9001:2008, *Quality management systems — Requirements (ISO 9001:2008)*

[10] EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025)*

[11] ISO 2975-1, *Measurement of water flow in closed conduits — Tracer methods — Part 1: General*

[12] ISO/TR 12764, *Measurement of fluid flow in closed conduits — Flowrate measurement by means of vortex shedding flowmeters inserted in circular cross-section conduits running full*

[13] ISO 10790, *Measurement of fluid flow in closed conduits — Guidance to the selection, installation and use of Coriolis meters (mass flow, density and volume flow measurements)*

[14] DIRECTIVE 2003/87/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC

[15] COMMISSION DECISION of 18 July 2007 establishing guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council (notified under document number C(2007) 3416) (Text with EEA relevance) (2007/589/EC)

[16] DIRECTIVE 2004/22/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 31 March 2004 on measuring instruments (Text with EEA relevance)

[17] AGA Report No. 9, *Measurement of Gas by Multipath Ultrasonic Meters*

[18] AGA Report No. 11 API MPMS 14.9, *Measurement of Natural Gas by Coriolis Meter*

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