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I.S. EN 14211:2012

Ambient air - Standard method for the measurement of the concentration of nitrogen dioxide and nitrogen monoxide by chemiluminescence

I.S. EN 14211:2012

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Údarás um Chaighdeáin Náisiúnta na hÉireann

English Version

Ambient air - Standard method for the measurement of the concentration of nitrogen dioxide and nitrogen monoxide by chemiluminescence

Air ambient - Méthode normalisée pour le mesurage de la concentration en dioxyde d'azote et monoxyde d'azote par chimiluminescence

Luftqualität - Messverfahren zur Bestimmung der Konzentration von Stickstoffdioxid und Stickstoffmonoxid mit Chemilumineszenz

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Foreword

This document (EN 14211:2012) has been prepared by Technical Committee CEN/TC 264 "Air quality", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2013, and conflicting national standards shall be withdrawn at the latest by February 2013.

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.

This document supersedes EN 14211:2005.

The technical changes made since EN 14211:2005 are listed in Annex H of this European Standard.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies a continuous measurement method for the determination of the concentrations of nitrogen dioxide and nitrogen monoxide present in ambient air based on the chemiluminescence measuring principle. This standard describes the performance characteristics and sets the relevant minimum criteria required to select an appropriate chemiluminescence analyser by means of type approval tests. It also includes the evaluation of the suitability of an analyser for use in a specific fixed site so as to meet the data quality requirements as specified in Annex I of Directive 2008/50/EC [1] and requirements during sampling, calibration and quality assurance for use.

The method is applicable to the determination of the concentration of nitrogen dioxide present in ambient air up to $500 \mu\text{g}/\text{m}^3$. This concentration range represents the certification range for NO_2 for the type approval test.

The method is applicable to the determination of the concentration of nitrogen monoxide present in ambient air up to $1\,200 \mu\text{g}/\text{m}^3$. This concentration range represents the certification range for NO for the type approval test.

NOTE 1 It is possible to use other ranges depending on the levels present in ambient air.

NOTE 2 When this European Standard is used for other purposes than for measurements required by Directive 2008/50/EC, the ranges and uncertainty requirements may not apply.

The method covers the determination of ambient air concentrations of nitrogen dioxide and nitrogen monoxide in zones classified as rural areas, urban-background areas and traffic-orientated locations and locations influenced by industrial sources.

The results are expressed in $\mu\text{g}/\text{m}^3$ (at $20 \text{ }^\circ\text{C}$ and $101,3 \text{ kPa}$).

NOTE 3 $500 \mu\text{g}/\text{m}^3$ of NO_2 corresponds to $261 \text{ nmol}/\text{mol}$ of NO_2 at $20 \text{ }^\circ\text{C}$ and $101,3 \text{ kPa}$. $1\,200 \mu\text{g}/\text{m}^3$ of NO corresponds to $962 \text{ nmol}/\text{mol}$ of NO at $20 \text{ }^\circ\text{C}$ and $101,3 \text{ kPa}$.

This standard contains information for different groups of users.

Clauses 5 to 7 and Annexes B and C contain general information about the principles of NO_x measurement by chemiluminescence analyser and sampling equipment.

Clause 8 and Annex E are specifically directed towards test houses and laboratories that perform type-approval testing of NO_x analysers. These sections contain information about:

- Type-approval test conditions, test procedures and test requirements;
- Analyser performance requirements;
- Evaluation of the type-approval test results;
- Evaluation of the uncertainty of the measurement results of the NO_x analyser based on the type-approval test results.

Clauses 9 to 11 and Annexes F and G are directed towards monitoring networks performing the practical measurements of NO_x in ambient air. These sections contain information about:

- Initial installation of the analyser in the monitoring network and acceptance testing;
- Ongoing quality assurance/quality control;
- Calculation and reporting of measurement results;
- Evaluation of the uncertainty of measurement results under practical monitoring conditions.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 15267-1, *Air quality — Certification of automated measuring systems — Part 1: General principles*

EN 15267-2, *Air quality — Certification of automated measuring systems — Part 2: Initial assessment of the AMS manufacturer's quality management system and post certification surveillance for the manufacturing process*

EN ISO 6142, *Gas analysis — Preparation of calibration gas mixtures — Gravimetric method (ISO 6142)*

EN ISO 6143, *Gas analysis — Comparison methods for determining and checking the composition of calibration gas mixtures (ISO 6143)*

EN ISO 6144, *Gas analysis — Preparation of calibration gas mixtures — Static volumetric methods (ISO 6144)*

EN ISO 6145-6, *Gas analysis — Preparation of calibration gas mixtures using dynamic volumetric methods — Part 6: Critical orifices (ISO 6145-6)*

EN ISO 6145-7, *Gas analysis — Preparation of calibration gas mixtures using dynamic volumetric methods — Part 7: Thermal mass-flow controllers (ISO 6145-7)*

EN ISO 6145-10, *Gas analysis — Preparation of calibration gas mixtures using dynamic volumetric methods — Part 10: Permeation method (ISO 6145-10)*

EN ISO 14956, *Air quality — Evaluation of the suitability of a measurement procedure by comparison with a required measurement uncertainty (ISO 14956)*

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

ENV 13005:1999, *Guide to the expression of uncertainty in measurement*

3 Terms and definitions

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

3.1 adjustment

set of operations carried out on a measuring system so that it provides prescribed indications corresponding to given values of a quantity to be measured

Note 1 to entry: Types of adjustment of a measuring system include zero adjustment of a measuring system, offset adjustment, and span adjustment (sometimes called gain adjustment).

Note 2 to entry: Adjustment of a measuring system should not be confused with calibration, which is a prerequisite for adjustment.

[SOURCE: JCGM 200:2012 (VIM) [2]]

Note 3 to entry: In the context of this standard, adjustment is generally performed on measurement data rather than on the analyser.

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