SLOVENSKI STANDARD
SIST EN 14212:2025

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Zunanji zrak - Standardna metoda za določanje koncentracije žveplovega dioksida z ultravijolično fluorescenco

Ambient air - Standard method for the measurement of the concentration of sulphur dioxide by ultraviolet fluorescence

Außenluft - Messverfahren zur Bestimmung der Konzentration von Schwefeldioxid mit Ultraviolett-Fluoreszenz

Air ambiant - Méthode normalisée pour le mesurage de la concentration en dioxyde de soufre par fluorescence U.V.

Ta slovenski standard je istoveten z: **EN 14212:2024**

ICS:

13.040.20 Kakovost okoljskega zraka Ambient atmospheres

SIST EN 14212:2025 **en,fr,de**

EUROPEAN STANDARD

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EN 14212

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Supersedes EN 14212:2012

English Version

Ambient air - Standard method for the measurement of the concentration of sulphur dioxide by ultraviolet fluorescence

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Außenluft - Messverfahren zur Bestimmung der Konzentration von Schwefeldioxid mit Ultraviolett-Fluoreszenz

This European Standard was approved by CEN on 11 November 2024.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 14212:2024) 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of an identical text or by endorsement, at the latest by June 2025, and conflicting national standards shall be withdrawn at the latest by June 2025.

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

This document supersedes EN 14212:2012.

The technical modifications in comparison with the previous edition are listed in Annex J of this document.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

1 Scope

This document specifies a continuous measurement method for the determination of the concentration of sulfur dioxide present in ambient air based on the ultraviolet fluorescence measuring principle. This document describes the performance characteristics and sets the relevant minimum criteria required to select an appropriate ultraviolet fluorescence analyser by means of type testing. 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 (see Annex I of Directive 2008/50/EC [1] for additional information) and requirements during sampling, calibration and quality assurance for use.

The method is applicable to the determination of the mass concentration of sulfur dioxide present in ambient air up to 1000 µg/m³. This concentration range represents the certification range for sulfur dioxide for type testing.

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

NOTE 2 Exemplar uncertainty budget calculations are given in Annexes E to H referring to Directive 2008/50/EC [1]. In the event that the Limit Values are updated in future iterations of Directive 2008/50/EC [1], the user can use these new values to calculate measurement uncertainties.

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

The results are expressed in µg/m³ (at 20 °C and 101,3 kPa).

NOTE 3 1 000 µg/m³ of SO_2 corresponds to 376 nmol/mol of SO_2.

This document contains information for different groups of users.

Clause 5 to Clause 7 and Annex C and Annex D contain general information about the principles of sulfur dioxide measurement by ultraviolet fluorescence analyser and sampling equipment.

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

— type testing conditions, test procedures and test requirements;

— analyser performance requirements;

— evaluation of the type testing results;

— evaluation of the associated uncertainty of the measurement performed by the sulfur dioxide analyser based on the type testing results.

Clause 9 to Clause 11 and Annex F, Annex G and Annex H are directed towards monitoring networks performing the practical measurements of sulfur dioxide 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 the measurement results under practical monitoring conditions.

This document represents an evolution of earlier editions (EN 14212:2005 and EN 14212:2012).

NOTE 4 Analysers type tested prior to the publication of this document can still be used for regulated monitoring purposes. As newer versions of analysers tested under this document become available, discontinue the use of older reference analysers.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. 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 - Assessment of air quality monitoring equipment - Part 1: General principles of certification*

EN 15267-2, *Air quality - Assessment of air quality monitoring equipment - Part 2: Initial assessment of the 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 method (ISO 6144)*

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

EN ISO 6145-7, *Gas analysis - Preparation of calibration gas mixtures using dynamic 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 19229, *Gas analysis - Purity analysis and the treatment of purity data*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
adjustment of a measuring system
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.

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

[SOURCE: JCGM 200:2012, 3.11 [2]]

3.2
ambient air
outdoor air in the troposphere where provisions concerning health and safety at work apply and to which members of the public do not have regular access

Note 1 to entry: This excludes workplaces as defined by Directive 89/654/EEC.

[SOURCE: Council Directive 2008/50/EC [1]]

3.3
analyser
measuring system that provides an output signal which is a function of the concentration or partial pressure of one or more components in a gas mixture and flow or temperature of this gas mixture

3.4
availability of the analyser
fraction of the time period for which valid measuring data of the ambient air concentration is available from an analyser

3.5
calibration
operation that, under specified conditions, in a first step, establishes a relation between the quantity values with measurement uncertainties provided by measurement standards and corresponding indications with associated measurement uncertainties and, in a second step, uses this information to establish a relation for obtaining a measurement result from an indication

Note 1 to entry: A calibration may be expressed by a statement, calibration function, calibration diagram, calibration curve, or calibration table. In some cases, it may consist of an additive or multiplicative correction of the indication with associated measurement uncertainty.

Note 2 to entry: Calibration should not be confused with adjustment of a measuring system, often mistakenly called "self-calibration", nor with verification of a calibration.

Note 3 to entry: Often, the first step alone in the above definition is perceived as being calibration.

Note 4 to entry: In the context of this document, calibration is a comparison of the analyser response to a known gas concentration with a known uncertainty when the information obtained from the comparison is used for the successive adjustment (if needed) of the analyser.

[SOURCE: JCGM 200:2012, 2.39 [2]]

3.6
certification range
concentration range for which the analyser is type tested

3.7
check
verification that the analyser is still operating within specified performance limits

3.8
combined standard uncertainty
standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities, equal to the positive square root of a sum of terms, the terms being the variances or co-variances of these other quantities weighted according to how the measurement result varies with changes in these quantities

[SOURCE: JCGM 100:2008, 2.3.4 [3]]

3.9
coverage factor
numerical factor used as a multiplier of the combined standard uncertainty in order to obtain an expanded uncertainty

[SOURCE: JCGM 100:2008, 2.3.6 [3]]

3.10
competent body
organization which can demonstrate its competence for a specific task to the national competent authority of the Member State