



SLOVENSKI STANDARD

SIST EN 13528-1:2003

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Ambient air quality - Diffusive samplers for the determination of concentrations of gases and vapours - Requirements and test methods - Part 1: General requirements

Außenluftqualität - Passivsammler zur Bestimmung der Konzentrationen von Gasen und Dämpfen - Anforderungen und Prüfverfahren Teil 1: Allgemeine Anforderungen

Qualité de l'air ambiaent - Echantillonneurs par diffusion pour la détermination des concentrations des gaz et des vapeurs - Exigences et méthodes d'essai - Partie 1: Exigences générales

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EUROPEAN STANDARD
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Ambient air quality - Diffusive samplers for the determination of concentrations of gases and vapours - Requirements and test methods - Part 1: General requirements

Qualité de l'air - Echantillonneurs par diffusion pour la détermination des concentrations des gaz et des vapeurs - Prescriptions et méthodes d'essai - Partie 1: Prescriptions générales

Außenluftqualität - Passivsammler zur Bestimmung der Konzentrationen von Gasen und Dämpfen - Anforderungen und Prüfverfahren - Teil 1: Allgemeine Anforderungen

This European Standard was approved by CEN on 21 July 2002.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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Foreword

This document (EN 13528-1:2002) 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 March 2003, and conflicting national standards shall be withdrawn at the latest by March 2003.

This European Standard is a multi-part standard having the following parts:

- Part 1 (Ambient Air Quality) General requirements;
- Part 2 (Ambient Air Quality) Specific requirements and test methods;
- Part 3 (Ambient Air Quality) Guide to selection, use and maintenance.

Annex A is informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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EN 13528-1:2002 (E)

Introduction

This European Standard specifies requirements and test methods for the determination of performance characteristics of diffusive samplers used for the determination of concentrations of gases and vapours in ambient atmospheres.

With regard to air quality, the objectives fixed in the 5th Action Programme of the European Union are for the effective protection of all people against recognised risks from air pollution and the establishment of permitted concentration levels of air pollutants, which should take into account the protection of the environment. These objectives include monitoring of concentrations with regard to standards.

Successive programmes of action of the European Union on the protection of the environment have stressed the need to find a balance between the use of different tools: product standards, emission limits and environmental objectives/standards.

The implementation of existing Directives has highlighted the existence of various problems, which are being addressed in the Council Directive on Ambient Air Quality Assessment and Management [1]. These include:

- the different monitoring strategies in comparable situations between and within Member States;
- the harmonisation of measuring methods;
- the quality of the measurements which depends on the calibration and quality assurance procedures.

Diffusive samplers used to measure air quality have to fulfil some general requirements, which are given in this part of EN 13528. These requirements include unambiguity, selectivity and Data Quality Objectives, including uncertainty.

Such general requirements can also be appropriate for other measurement procedures used in the assessment of ambient air quality.

In addition, diffusive samplers used to measure air quality shall also fulfil some specific requirements in addition to those specified in this part of EN 13528. These specific requirements are given in EN 13528-2. EN 13528-3 gives guidance on the selection, use and maintenance of diffusive samplers used to measure ambient air quality.

It is the user's primary responsibility to choose appropriate procedures or devices that meet the requirements in this European Standard. One way of doing this is to obtain information or confirmation from the manufacturer. Type testing, or more generally, the assessment of performance criteria of procedures or devices, can be undertaken by the manufacturer, user, test house or research and development laboratory, as is most appropriate.

Although this part of EN 13528 specifically addresses ambient air, diffusive sampling is also relevant to the assessment of air quality in indoor air. Both pumped and diffusive sampling procedures are considered appropriate for such measurements, depending on circumstances (particularly any requirement for time resolution) [2]. prEN 14412 gives guidance on the selection, use and maintenance of diffusive samplers used to measure indoor air quality.

This part of EN 13528 is similar in content to EN 482:1994 and EN 13528-2 is similar in content to EN 838:1995. The series of standards on the use of diffusive samplers for ambient air has been created in addition to those for workplace air because the underlying European Directives are different and the consequent definitions and practical applications of the estimation of the uncertainty of measurements are different.

1 Scope

This European Standard specifies general performance requirements for diffusive samplers used for the determination of the concentration of gases and vapours in ambient air.

Such requirements apply to all diffusive samplers, irrespective of the physical nature of the rate controlling process and irrespective of the nature of the sorption process and the analytical determination.

This standard applies to all stages of the measuring procedure, including deployment, transportation and storage of the sample where appropriate.

This standard applies to measuring procedures with separate sampling and analysis stages, and also to direct-reading devices.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:1999)*.

ISO 5725:1994, *Accuracy (trueness and precision) of measurement methods and results (all parts)*.

3 Terms and definitions

For the purpose of this European Standard the following terms and definitions apply.

3.1

ambient air

outdoor air in the troposphere, excluding indoor air and workplaces

3.2

averaging time

period of time for which the measuring procedure yields a single value [EN 482:1994]

3.3

bias

difference between the expectation of the test results and an accepted reference value [ISO 3534-1:1993]

3.4

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 covariances of these other quantities weighted according to how the measurement result varies with changes in these quantities [ENV 13005]

3.5

desorption efficiency

ratio of the mass of analyte desorbed from a sampling device to that applied [EN 838:1995]

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**3.6
diffusive sampler**
device which is capable of taking samples of gases or vapours from the atmosphere at a rate controlled by a physical process such as gaseous diffusion through a static air layer or a porous material and/or permeation through a membrane, but which does not involve the active movement of air through the device

NOTE 1 Active normally refers to the pumped movement of air.

NOTE 2 This definition differs from that in EN 838:1995 by the addition of the words 'or a porous material'.

**3.7
expanded uncertainty**
quantity defining an interval about the result of a measurement that may be expected to encompass a large fraction of the distribution of values that could reasonably be attributed to the measurand

NOTE 1 The fraction may be viewed as the coverage probability or level of confidence of the interval.

NOTE 2 To associate a specific level of confidence with the interval defined by the expanded uncertainty requires explicit or implicit assumptions regarding the probability distribution characterised by the measurement result and its combined standard uncertainty. The level of confidence that can be attributed to the interval can be known only to the extent to which such assumptions may be justified.

NOTE 3 Expanded uncertainty is termed *overall uncertainty* in ENV 13005.

[ENV 13005]

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**3.8
measuring procedure**
procedure for sampling and analysing one or more pollutants in ambient air and including storage and transportation of the sample

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**3.9
repeatability conditions**
conditions where independent test results are obtained with the same method on identical test items in the same laboratory by the same operator using the same equipment within short intervals of time [ISO 3534-1:1993]

**3.10
reproducibility conditions**
conditions where test results are obtained with the same method on identical test items in different laboratories with different operators using different equipment [ISO 3534-1:1993]

**3.11
selectivity**
degree of independence from interferents

**3.12
standard uncertainty**
uncertainty of the result of a measurement expressed as a standard deviation [ENV 13005]

**3.13
uncertainty (of measurement)**
parameter, associated with the results of a measurement, that characterises the dispersion of values that could reasonably be attributed to the measurand

NOTE 1 The parameter may be, for example, a standard deviation (or given multiple of it), or the half width of an interval having a stated level of confidence.

NOTE 2 Uncertainty of measurement comprises, in general, many components. Some of these components may be evaluated from the statistical distribution of the results of a series of measurements and can be characterised by experimental standard

deviations. The other components, which can also be characterised by standard deviations, are evaluated from assumed probability distributions based on experience or other information.

NOTE 3 It is understood that the result of a measurement is the best estimate of the value of a measurand, and that all components of uncertainty, including those arising from systematic effects, such as components associated with corrections and reference standards, contribute to this dispersion [ENV 13005].

Attention is drawn to the fact that the terms Assessment, Limit Value and Pollutant are defined in Directive 96/62/EC [1].

4 Assessment regimes

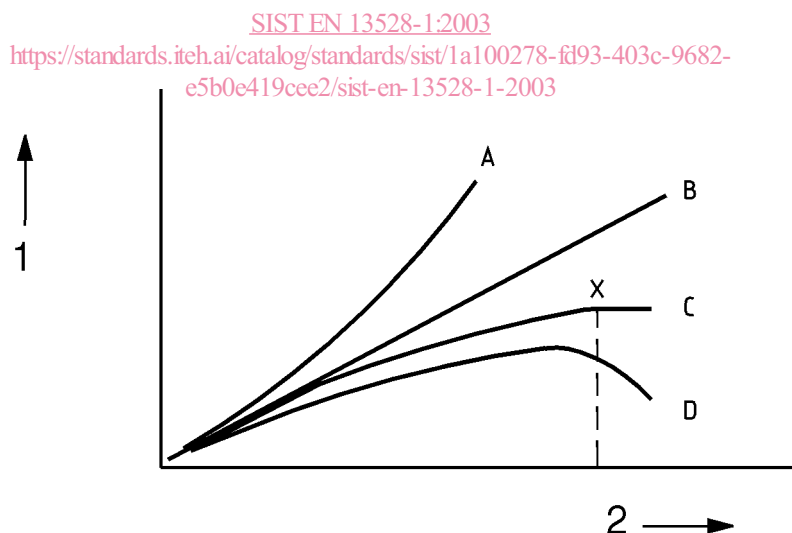
Different regimes of air quality assessment are possible for the implementation of the Council Directive on Ambient Air Quality Assessment and Management [1], and successive Daughter Directives, in which the measurement requirements are relaxed as the risk of exceeding the limit values decreases (see annex A).

Other assessment regimes may be required by a number of other EU regulations (Acidification Directive, Directive on Forest Protection) as well as in national or regional legislation. They are handled separately within the context of each particular regulation.

5 Performance requirements

5.1 Unambiguity

Every measurement procedure shall produce an unambiguous measurement result of concentration of the pollutant being measured. This means that an analytically determined value shall correspond to one concentration only. Thus, in Figure 1, plots A and B are unambiguous, plot C is ambiguous above X and plot D is ambiguous.



Key

- 1 Measurement result
- 2 Concentration

Figure 1 — Relationship between measurement result and pollutant concentration