

**Indoor air quality - Diffusive samplers  
for the determination of concentration  
of gases and vapours - Guide for  
selection, use and maintenance**

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determination of concentration of gases and vapours  
- Guide for selection, use and maintenance

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 14412:2004 sisaldab Euroopa standardi EN 14412:2004 ingliskeelset teksti.	This Estonian standard EVS-EN 14412:2004 consists of the English text of the European standard EN 14412:2004.
Käesolev dokument on jõustatud 21.12.2004 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.	This document is endorsed on 21.12.2004 with the notification being published in the official publication of the Estonian national standardisation organisation.
Standard on kättesaadav Eesti standardiorganisatsioonist.	The standard is available from Estonian standardisation organisation.

<b>Käsitlusala:</b> This European Standard gives guidelines for the selection, use and maintenance of diffusive samplers used to analyse gaseous pollutants in indoor air including measurement strategy and planning. This European Standard gives guidelines for the selection, use and maintenance of diffusive samplers used to measure indoor air quality and personal exposure. This European Standard is applicable to indoor air quality assessment because crucial differences to ambient air measurement have to be taken into account concerning environmental parameters, measurement strategy, as well as the nature, number, source and abundance of indoor air pollutants.	<b>Scope:</b> This European Standard gives guidelines for the selection, use and maintenance of diffusive samplers used to analyse gaseous pollutants in indoor air including measurement strategy and planning. This European Standard gives guidelines for the selection, use and maintenance of diffusive samplers used to measure indoor air quality and personal exposure. This European Standard is applicable to indoor air quality assessment because crucial differences to ambient air measurement have to be taken into account concerning environmental parameters, measurement strategy, as well as the nature, number, source and abundance of indoor air pollutants.
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**Võtmesõnad:** analysis, diffusive samplers, gas concentrations, gases, handling, impurities, indoor climate, indoors, measurement, measuring techniques, passive collectors, pollution of the air, sampling, sampling methods, selection, strategy of measurement, use, vapours

ICS 13.040.20

English version

**Indoor air quality - Diffusive samplers for the determination of concentrations of gases and vapours - Guide for selection, use and maintenance**

Qualité de l'air intérieur - Échantillonneurs par diffusion pour la détermination de la concentration des gaz et des vapeurs - Guide pour la sélection, l'utilisation et la maintenance

Innenraumluftqualität - Passivsammler zur Bestimmung der Konzentrationen von Gasen und Dämpfen - Anleitung zur Auswahl, Anwendung und Handhabung

This European Standard was approved by CEN on 9 July 2004.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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



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## Foreword

This document (EN 14412:2004) 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 2005, and conflicting national standards shall be withdrawn at the latest by March 2005.

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

## Introduction

European Standard EN 13528 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 and indoor atmospheres. Additionally this document provides a guidance for the user when selecting an appropriate type of sampler, measurement strategy and maintenance procedure.

EN 13528 is a multi-part standard having the following parts:

- Part 1 (Ambient air quality – Diffusive samplers for the determination of concentrations of gases and vapours – Requirements and test methods): General requirements.
- Part 2 (Ambient air quality – Diffusive samplers for the determination of concentrations of gases and vapours – Requirements and test methods): Specific requirements and test methods.
- Part 3 (Ambient air quality – Diffusive samplers for the determination of concentrations of gases and vapours – Requirements and test methods): Guide to selection, use and maintenance.

Because of the importance of these samplers in the process of monitoring, diffusive samplers used to measure indoor air quality have to fulfil some general requirements related to the sampling objective. These requirements are given in EN 13528-1 for measuring ambient air quality. The same principles apply to measuring indoor air although the target values have yet to be set by the Regulatory Authorities at either National, European or International level.

These requirements include unambiguity, selectivity and data quality objectives, including uncertainty.

In addition, diffusive samplers used to measure ambient and indoor air quality have to also fulfil some specific requirements in addition to those specified in EN 13528-1. These specific requirements are given in EN 13528-2 for measuring ambient air quality. The same principles apply to measuring indoor air. These requirements include desorption efficiency, diffusive uptake rate and sensitivity to air velocity.

Such general and specific requirements may also be appropriate for other measuring objectives used in the assessment of indoor air quality.

It is the user's primary responsibility to choose appropriate procedures or devices that meet the requirements of this document. 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, may be undertaken by the manufacturer, user, test house or research and development laboratory, as is most appropriate.

EN 13528-3 gives guidance on the selection, use and maintenance of diffusive samplers used to measure ambient air quality.

For the special tasks of sampling workplace air, the regulations of the European Standard EN 482 [1] and EN 838 apply. This document on the use of diffusive samplers for indoor air has been created in addition to those for workplace air because the measurement strategies, the underlying European Directives for ambient air [2], limit and guideline values and the consequent definitions and practical applications of the estimation of the uncertainty of measurements are different.

## 1 Scope

This document gives guidelines for the selection, use and maintenance of diffusive samplers used to analyse gaseous pollutants in indoor air including measurement strategy and planning.

This document gives guidelines for the selection, use and maintenance of diffusive samplers used to measure indoor air quality and personal exposure. This document is applicable to indoor air quality assessment because crucial differences to ambient air measurement have to be taken into account concerning environmental parameters, measurement strategy, as well as the nature, number, source and abundance of indoor air pollutants.

In contrast to typical ambient air measurements the appearance of unexpected compounds in indoor air environments is quite common. Procedures to calculate specific uptake rates of these compounds are needed more often as there is only a limited number of uptake rates validated by experiments (see EN 13528-2 and EN 13528-3) to assess the respective concentration values. In addition to the general calculation procedure of the individual uptake rate as given in EN 13528-2 and EN 13528-3 detailed procedures to calculate diffusion coefficients and the uptake rate are given in annex C of this document.

## 2 Normative references

The following referenced documents are indispensable for the application 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 13528-2:2002, *Ambient air quality – Diffusive samplers for the determination of concentrations of gases and vapours – Requirements and test methods – Part 2: Specific requirements and test methods*.

ISO 16000-1, *Indoor air – Part 1: General aspects of sampling strategy*.

## 3 Terms and definitions

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

### 3.1

#### **ambient air**

outdoor air in the troposphere, excluding indoor air and workplaces

[EN 13528-1:2002]

### 3.2

#### **averaging time**

period of time for which the measuring procedure yields a single value

[EN 13528-1:2002]

### 3.3

#### **cross-sectional area of the diffusion path**

cross-sectional area of the space inside the diffusive sampler, which is available for the diffusion process, expressed in square centimetres. This cross-sectional area may be identical to the intake opening