

**Töökeskonna õhu kvaliteet. Difusioon-
proovivõtmisvahendid gaaside ja
aurude määramiseks. Nõuded ja
katsemeetodid**

Workplace atmospheres - Diffusive samplers for the
determination of gases and vapours - Requirements
and test methods

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 838:1999 sisaldab Euroopa standardi EN 838:1995 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 12.12.1999 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 838:1999 consists of the English text of the European standard EN 838:1995.</p> <p>This document is endorsed on 12.12.1999 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p>Käsitlusala:</p> <p>Käesolev Euroopa standard määrab kindlaks töökarakteristikud ja testimismeetodites ettenähtud laboratoorsed tingimused difusioon-proovivõtmisvahenditele, mida kasutatakse aurude või gaaside määramiseks töökeskkonnas. Lisades C ja D kirjeldatakse täiendavaid teste, mis on ette nähtud selle väljaselgitamiseks, kas erinevad antud kasutusosal esineda võivad keskkonnategurid avaldavad difusioonproovidele kahjulikku mõju.</p>	<p>Scope:</p>
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Võtmesõnad: desorptsioon, difusioon, efektiivsus, gaasianalüüs, gaasid, karakteristikud, kontsentratsioon, kvaliteet, proovivõtmisvarustus, testid, tööruum, õhk, õhu saastumine

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Descriptors: Air pollution, workplaces, samplers, occupational safety, testing, requirements.

English version

Workplace atmospheres

**Diffusive samplers for the determination
of gases and vapours**

Requirements and test methods

Atmosphères des lieux de travail; échantillonneurs par diffusion pour la détermination des gaz et vapeurs; prescriptions et méthodes d'essai

Luftbeschaffenheit am Arbeitsplatz; Diffusionssammler für Gase und Dämpfe; Anforderungen und Prüfung

This European Standard was approved by CEN on 1995-07-14.

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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

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Contents

	Page
Foreword	2
0 Introduction	3
1 Scope	3
2 Normative references	4
3 Definitions	4
4 Symbols and abbreviations	4
5 Requirements	5
6 General test conditions	7
7 Test methods	9
8 Levels of evaluation	15
9 Test report	15
10 Marking	16
Annex A (normative) Analysis of experimental data (two-factor experiment)	17
Annex B (informative) Fundamentals of diffusive sampling	24
Annex C (informative) Field tests – Paired comparisons	25
Annex D (informative) Field tests – Multiple comparisons	26
Annex E (normative) Environmental influences – Multifactor test	28
Annex F (normative) Computational analysis of fractional factor data	29
Annex G (informative) Bibliography	31

Foreword

This European Standard was prepared by Technical Committee CEN/TC 137 'Assessment of workplace exposure', 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, and conflicting national standards withdrawn, by May 1996 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard:

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

0 Introduction

CEN/TC 137 "Assessment of workplace exposure" has proposed general performance criteria that methods of determining the concentration of chemical agents in workplace atmosphere should meet (see EN 482). These performance criteria include maximum values of overall uncertainty (a combination of precision and bias) achievable under prescribed laboratory conditions for the methods to be used. In addition, the performance criteria should also be met under a wider variety of environmental influences, representative of workplace conditions.

1 Scope

1.1 General

This European Standard specifies performance requirements and test methods under prescribed laboratory conditions for a diffusive sampler used for the determination of gases or vapours in workplace atmospheres.

Additional tests designed to establish whether the performance characteristics of the diffusive sampler are affected by the wider range of environmental influences that may be encountered in field use are described in annexes C and D.

If there is no diffusive sampler for measuring a particular chemical agent which meets the requirements of this European Standard, it is recommended to use a diffusive sampler whose performance is nearest to the specified requirements.

1.2 Field of application

The European Standard is applicable to:

- type A samplers: diffusive samplers which are used for the direct determination of concentrations, for example, length-of-stain detector tubes;
- type B samplers: diffusive samplers which are used for the indirect determination of concentration by sampling and analysis in separate stages.

Type B samplers may be further divided into:

- type B 1 samplers: diffusive samplers which rely on sorption onto a solid, desorption with solvent, and subsequent analysis of the desorbate;
- type B 2 samplers: diffusive samplers which rely on sorption onto a solid, desorption by heat, and analysis of the desorbate;
- type B 3 samplers: diffusive samplers which rely on sorption into a liquid, and subsequent analysis of the solution.

Specific aspects of the use of reagent impregnated systems will be covered in additional parts of this standard.

1.3 Object of standard

This European Standard should enable manufacturers and users of diffusive samplers to adopt a consistent approach to sampler validation and provide a framework for the assessment of sampler performance against criteria specified in EN 482. It is the responsibility of the manufacturer or of those who assemble the diffusive samplers to ensure that the sampler complies with the overall uncertainty requirements under the specified laboratory conditions given in this European Standard including such environmental influences, (e. g. temperature and humidity) that may be expected to affect performance.

No useful performance requirements can be given for the effect of interferents (with the exception of water vapour). However, the user of diffusive samplers should be cautioned that interferences may occur especially for type A samplers. Such information shall be included in the instructions for use.

If it is known in advance that a certain type of diffusive sampler is unaffected by an environmental influence, then the relevant tests in 7.7 to 7.9, or the equivalent in annex E shall be modified to examine only the factors likely to have an influence.

NOTE 1: Annexes C and D relating to field tests are not obligatory as part of this European Standard but are directed primarily to the users of such devices, who are in the best position to know the specific factors that may significantly affect sampler performance.

NOTE 2: Because of the known effect of pressure on diffusion coefficients, a pressure test is not necessary.

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.

EN 482

Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents

3 Definitions

For the purposes of this standard, the following definitions apply.

3.1 bias, limit value, measuring procedure, overall uncertainty, precision, true value, validation

Definitions for these terms are as in EN 482.

3.2 desorption efficiency: The ratio of the mass of analyte desorbed from a sampling device to that applied.

3.3 diffusive sampler: A 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 permeation through a membrane, but which does not involve the active movement of air through the sampler.

3.4 diffusive uptake rate: The rate at which the diffusive sampler collects a particular gas or vapour from the atmosphere, expressed in nanograms per parts per million (volume/volume) per minute ($\text{ng ppm}^{-1}(\text{V/V}) \text{ min}^{-1}$) or cubic centimetres per minute ($\text{cm}^3 \text{ min}^{-1}$).

3.5 exposure dose: The product of exposure concentration expressed in parts per million, (volume/volume) or milligrams per cubic metre (ppm (V/V) , or mg m^{-3}) and exposure time expressed in minutes or hours.

4 Symbols and abbreviations

- A** the cross-sectional area of sorption surface, in square centimetres;
- C** the observed concentration in milligrams per cubic metre;
- C'** the observed concentration in parts per million (volume/volume);
- D** the diffusion coefficient of analyte, in square centimetres per minute;
- D₁** the diffusion coefficient of analyte 1;
- D₂** the diffusion coefficient of analyte 2;