

Workplace atmospheres — Measurement of chemical agents present as mixtures of airborne particles and vapour — Requirements and test methods

ICS 13.040.30

National foreword

This Draft for Development is the English language version of ENV 13936:2001.

This publication is not to be regarded as a British Standard.

It is being issued in the Draft for Development series of publications and is of a provisional nature because it has been prepared to enable method developers and users of particle/vapour sampling systems to adopt a consistent approach to method validation and provide a framework for the assessment of method performance against criteria specified in EN 482. It should be applied on this provisional basis, so that information and experience of its practical application may be obtained.

Comments arising from the use of this Draft for Development are requested so that UK experience can be reported to the European organization responsible for its conversion into a European Standard. A review of this publication will be initiated 2 years after its publication by the European organization so that a decision can be taken on its status at the end of its three-year life. The commencement of the review period will be notified by an announcement in *Update Standards*.

According to the replies received by the end of the review period, the responsible BSI Committee will decide whether to support the conversion into a European Standard, to extend the life of the prestandard or to withdraw it. Comments should be sent in writing to the Secretary of BSI Subcommittee EH/2/2, Workplace Atmospheres, at 389 Chiswick High Road, London W4 4AL, giving the document reference and clause number and proposing, where possible, an appropriate revision of the text.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

This Draft for Development, having been prepared under the direction of the Health and Environment Sector Policy and Strategy Committee, was published under the authority of the Standards Policy and Strategy Committee on 29 August 2001

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English version

**Workplace atmospheres - Measurement of chemical agents
present as mixtures of airborne particles and vapour -
Requirements and test methods**

Atmosphères sur les lieux de travail - Mesurage des agents
chimiques sous forme de mélanges de particules aériennes
et de vapeurs - Exigences et méthodes d'essai

Arbeitsplatzatmosphäre - Messung chemischer Stoffe, die
als Mischung von luftgetragenen Partikeln und Dämpfen
vorkommen - Anforderungen und Prüfverfahren

This European Prestandard (ENV) was approved by CEN on 20 April 2001 as a prospective standard for provisional application.

The period of validity of this ENV is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the ENV can be converted into a European Standard.

CEN members are required to announce the existence of this ENV in the same way as for an EN and to make the ENV available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the ENV) until the final decision about the possible conversion of the ENV into an EN is reached.

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



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Foreword

This European Prestandard has been prepared by Technical Committee CEN/TC 137 "Assessment of workplace exposure", the secretariat of which is held by DIN.

Annex A is normative. Annex B is informative.

This Prestandard includes a Bibliography.

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

Introduction

CEN/TC 137 'Assessment of workplace exposure' has proposed general performance criteria that methods of determining the concentration of chemical agents in workplace atmospheres 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.

Chemical agents are often present in workplace air as complex mixtures, distributed in both gaseous and non-gaseous phases. These mixtures may be comprised of single compounds, e.g. an aerosol of a volatile liquid in equilibrium with its own vapour, or of multiple compounds, some of which may be entirely in the vapour phase (including water vapour), and others entirely in the solid or liquid phase.

For health-related sampling, priority should be given to accurate measurement of the inhalable mass concentration of harmful chemical agents, regardless of whether they are present as airborne particles or vapour. Collected volatile materials may move between phases due to a change in conditions, during sampling and subsequently, but the total collected mass remains unchanged. Similar phase changes will also occur during inhalation and will differ from those occurring in the sample.

In some cases it may also be desirable to measure the distribution of chemical agents between the particulate and vapour phases as well as the inhalable mass concentration. For example, there may be compounds whose health effects are known to differ significantly depending on whether they exist as particles or vapour. In addition, control measures in the workplace may depend on which phase dominates. Exposure limits may be phase-specific. However the separate quantitation of particle / vapour mixtures according to phase is technically complex, and subject to error using existing sampling technologies. For this reason this prestandard does not require the sampling method to differentiate between phases in a particle / vapour mixture.

1 Scope

1.1 General

This prestandard specifies requirements and test methods for measurement of the inhalable airborne mass concentration of particle / vapour mixtures of both single and multiple compounds, with reference to existing CEN standards where relevant. The prestandard applies to the measurement of the inhalable concentration of compounds, regardless of the distribution into particles and vapour. Sampling methods are not required to differentiate between phases.

1.2 Field of application

This prestandard gives guidance on various approaches to sampling particle / vapour mixtures, their advantages and limitations, in annex B. The prestandard only applies to sampling systems whose component elements are covered by existing standards; not all possible approaches can be covered. Normally, performance requirements will be tested separately for the airborne particle sampling and for the vapour sampling components whilst using the complete system for the tests, unless otherwise specified in clause 4. The prestandard does not apply when the atmosphere to be sampled is composed of almost all particles or almost all vapour, in which case sampling only particles or vapour as appropriate can be carried out without exceeding the overall uncertainty limits stated in EN 482. In this prestandard, a mixture of approximately equal proportions of particles and vapour is assumed in the calculation of overall uncertainty. This assumption may be considered valid when no fraction - particles or vapour - amounts to more than approximately 70% of the sampled mixture.

1.3 Object of prestandard

This European Prestandard should enable method developers and users of particle / vapour sampling systems to adopt a consistent approach to method validation and provide a framework for the assessment of method performance against criteria specified in EN 482. It is the responsibility of the manufacturer or of those who assemble particle / vapour samplers to ensure that the method complies with the overall uncertainty requirements under the specified laboratory conditions given in this European Prestandard, including the environmental influences that may be expected to affect performance.

2 Normative references

This European Prestandard 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 Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 481, *Workplace atmospheres - Size fraction definitions for measurement of airborne particles.*

EN 482, *Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents.*

EN 838:1995, *Workplace atmospheres - Diffusive samplers for the determination of gases and vapours - Requirements and test methods.*

EN 1076:1997, *Workplace atmospheres - Pumped sorbent tubes for the determination of gases and vapours - Requirements and test methods.*

EN 1232:1997, *Workplace atmospheres - Pumps for personal sampling of chemical agents - Requirements and test methods.*

EN 1540, *Workplace atmospheres - Terminology.*