

norm**NEN-EN 13890**

Werkplekatmosfeer - Procedures voor het meten van metalen en metalloïden in in de lucht verspreide deeltjes - Eisen en beproevingsmethoden

Publicatie uitsluitend voor commentaar

Workplace atmospheres - Procedures for measuring metals and metalloids in airborne particles - Requirements and test methods

mei 2000
ICS 13.040.30

Commentaar voor 2000-09-15

Als Europees normontwerp is gepubliceerd: prEN 13890:2000, IDT

Definitief vastgestelde normen zullen als Nederlandse norm gelden. Daarom wordt dit normontwerp in Nederland voor commentaar gepubliceerd. Op het ontwerp ingebracht commentaar zal aan de bevoegde normcommissie worden voorgelegd die hiermee rekening zal houden bij de bepaling van de Nederlandse stem. Indien er geen bezwaar bij het NNI wordt ingebracht, kan dat leiden tot ongewijzigd definitieve vaststelling van het ontwerp als norm.

Van Europese normen bestaan drie officiële versies, Engels, Frans en Duits. Voor Nederland zal de Engelse versie gelden, tenzij voor een geautoriseerde versie in het Nederlands wordt gekozen.

Normcommissie 390 146 "Luchtkwaliteit"

Apart from exceptions provided by the law, nothing from this publication may be duplicated and/or published by means of photocopy, microfilm, storage in computer files or otherwise, which also applies to full or partial processing, without the written consent of the Netherlands Standardization Institute.

The Netherlands Standardization Institute shall, with the exclusion of any other beneficiary, collect payments owed by third parties for duplication and/or act in and out of law, where this authority is not transferred or falls by right to the Reproduction Rights Foundation.

Auteursrecht voorbehouden. Behoudens uitzondering door de wet gesteld mag zonder schriftelijke toestemming van het Nederlands Normalisatie-instituut niets uit deze uitgave worden veeveelvoudigd en/of openbaar gemaakt door middel van fotokopie, microfilm, opslag in computerbestanden of anderszins, hetgeen ook van toepassing is op gehele of gedeeltelijke bewerking.

Het Nederlands Normalisatie-instituut is met uitsluiting van ieder ander gerechtigd de door derden verschuldigde vergoedingen voor veeveelvoudiging te innen en/of daartoe in en buiten rechte op te treden, voor zover deze bevoegdheid niet is overgedragen c.q. rechtens toekomt aan de Stichting Reprorecht.

Although the utmost care has been taken with this publication, errors and omissions cannot be entirely excluded. The Netherlands Standardization Institute and/or the members of the committees therefore accept no liability, not even for direct or indirect damage, occurring due to or in relation with the application of publications issued by the Netherlands Standardization Institute.

Hoewel bij deze uitgave de uiterste zorg is nagestreefd, kunnen fouten en onvolledigheden niet geheel worden uitgesloten. Het Nederlands Normalisatie-instituut en/of de leden van de commissies aanvaarden derhalve geen enkele aansprakelijkheid, ook niet voor directe of indirecte schade, ontstaan door of verband houdend met toepassing van door het Nederlands Normalisatie-instituut gepubliceerde uitgaven.

ICS

English version

Workplace atmospheres - Procedures for measuring metals and metalloids in airborne particles - Requirements and test methods

Atmosphères des lieux de travail - Procédures de mesurage des métaux et métalloïdes dans les particules en suspension dans l'air - Exigences et méthodes d'essai

Arbeitsplatzatmosphäre - Verfahren zur quantitativen Bestimmung von Metallen und Metalloiden in Schwebstoffen - Anforderungen und Prüfverfahren

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 137.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Contents

1	Scope	6
2	Normative reference(s)	6
3	Principle	7
4	Definitions	7
4.1	EN 1540 definitions	7
4.2	Measurement terms	7
4.3	Sampling terms	8
4.4	Statistical terms	8
5	Requirements	9
5.1	General requirements	9
5.1.1	Scope of the measuring procedure	9
5.1.2	Method performance	9
5.1.3	Safety information	9
5.1.4	Samplers	10
5.1.5	Sampling pumps	10
5.1.6	Other detailed requirements	10
5.2	Quantification limit	10
5.3	Analytical recovery	10
5.4	Overall uncertainty	10
6	Reagents	10
7	Test materials	10
7.1	Standard solutions	10
7.2	Pure compounds and reference materials	10
7.3	Test collection substrates	11
7.4	Apparatus	11
8	Test methods	11
8.1	Detection limits and quantification limits	11
8.1.1	Determination of detection limits and quantification limits	11
8.1.2	Comparison of results with the acceptance criteria	11
8.2	Selection of test methods for determination of analytical bias and precision	11
8.3	Analytical bias	11
8.3.1	Consideration of the analytical bias of procedures for soluble metals and metalloids	11
8.3.2	Determination of the analytical bias of procedures that involve sample dissolution or dispersion of the collected airborne particles in a liquid	12
8.4	Analytical precision	13
8.4.1	Determination of the analytical precision of procedures that involve sample transformation prior to analysis	13
8.4.2	Estimation of the analytical precision of procedures that do not involve sample transformation	14
8.5	Estimation of overall uncertainty	14
9	Test report	14
	Annexe A (informative) Guidance on selection of test methods	16
	Annexe B (informative) Guidance on determination of analytical bias	17
B.1	Determination of the analytical bias of procedures that involve sample dissolution	17
B.2	Determination or estimation of the analytical bias of procedures that do not involve a sample transformation	17
	Annexe C (informative) Example of estimation of overall uncertainty	18
	Annexe D (normative) Estimation of overall uncertainty	19
D.1	General performance requirements for measurement of chemical agents in air	19
D.2	Combination of sampling and analytical bias	20
D.3	Combination of sampling and analytical precision	20

D.4	Consideration of sampling bias and precision	20
D.4.1	Sampler bias	20
D.4.2	Sampling precision.....	20
D.5	Estimation of overall uncertainty.....	21
D.5.1	General case.....	21
D.5.2	Estimation of overall uncertainty of procedures for measuring metals and metalloids in inhalable dust	21
D.5.3	Estimation of overall uncertainty of procedures for measuring metals and metalloids in respirable dust.....	22
Annexe E (informative)	Bibliography	23

Forbiede
Preview

Foreword

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

Forbiede
Preview

Introduction

EN 482 prescribes general requirements for the performance of procedures for measuring chemical agents in workplace atmospheres. These requirements include maximum values of overall uncertainty (a combination of precision and bias) achievable under prescribed laboratory conditions.

This European Standard provides a framework for assessing the performance of procedures for measuring metals and metalloids against the criteria specified in EN 482. It enables producers and users of procedures for measuring metals and metalloids in airborne particles to adopt a consistent approach to method validation.

Orbital
Preview

1 Scope

This European Standard specifies performance requirements and test methods for procedures for measuring metals and metalloids in airborne particles collected on a suitable substrate, e.g. a filter.

This European Standard is not applicable to procedures for measuring metals or metalloids in inorganic gases or vapours, e.g. mercury, arsine, etc (see EN 838 and EN 1076), or to procedures for measuring metals and metalloids in compounds that could be present as a particle/vapour mixture, e.g. arsenic trioxide (see EN (00137016)).

This European Standard is applicable to measuring procedures in which sampling and analysis is carried out in separate stages, but it does not specify performance requirements for collection, transport and storage of samples, since these are dealt with in prEN 13205.

This European Standard specifies a method for determining the bias and precision of the analytical method and combining this with the bias and precision of the sampling method to estimate the overall uncertainty of the measuring procedure as a whole.

If there is no procedure for measuring a particular metal or metalloid which meets the requirements of this European Standard, it is recommended to use a measuring procedure whose performance is nearest to the specified requirements.

2 Normative reference(s)

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 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, *Workplace atmospheres — Diffusive samplers for the determination of gases and vapours — Requirements and test methods*

EN 1076, *Workplace atmospheres — Pumped sorbent tubes for the determination of gases and vapours — Requirements and test methods*

EN 1232, *Workplace atmospheres — Pumps for personal sampling of chemical agents — Requirements and test methods*

EN 1540, *Workplace atmospheres — Terminology*

EN 12919, *Workplace atmospheres — Pumps for sampling of chemical agents with a volume flow rate of over 5 l/min — Requirements and test methods*

prEN 13205, *Workplace atmospheres — Assessment of performance of instruments for measurement of airborne particle concentrations*

EN (00137016), *Workplace atmospheres — Measurement of chemical agents present as mixtures of airborne particles and vapour — Requirements and test methods*

ISO 3696, *Water for laboratory use — Specifications and test methods*

ISO 15202-2, *Workplace air — Determination of metals and metalloids in airborne particulate matter by inductively coupled plasma atomic emission spectrometry — Part 2: Sample preparation*

3 Principle

Sampling bias and precision are estimated by examining sampler performance data reported in the scientific literature.

For measuring procedures that specify a method for the determination of soluble metals and metalloids, the analytical bias is, by definition, taken to be zero.

For measuring procedures that specify a method for the determination of total metals and metalloids that involves sample dissolution, the analytical bias is determined by assessing the effectiveness of the sample dissolution method described in the procedure. This is achieved by analysing test samples, which can be pure compounds, bulk reference materials and/or samples of dust on collection substrates, and determining the analytical recovery of the metals and metalloids of interest. The analytical recovery is then carefully scrutinised to determine a typical upper limit for the analytical bias.

For measuring procedures that do not involve sample dissolution, e.g. X-ray fluorescence spectrometry, the analytical bias is determined by comparison with a reference method or by analysis of a reference material. Alternatively, in some instances, it can be estimated theoretically.

For measuring procedures that involve sample dissolution, the analytical precision is determined by analysing test samples prepared by spiking collection substrates with standard solutions of the metals and metalloids of interest. The repeatability of measurements made on collection substrates spiked with various sample loadings (corresponding to different concentrations of metal or metalloid in air and air sample volumes) gives a measure of the precision of the analytical method for different averaging times across the measuring ranges specified in EN 482.

For measuring procedures that do not involve sample dissolution, the analytical precision is determined in a similar manner, by analysing test samples prepared by loading test collection substrates with known amounts of dust. Alternatively, in some instances, it can be estimated theoretically.

The determined analytical bias and analytical precision are combined with the estimated sampling bias and precision to estimate the overall uncertainty of the measuring procedure as a whole. This is then assessed against the general performance requirements prescribed in EN 482.

4 Definitions

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

4.1 EN 1540 definitions

Averaging time, bias, chemical agent, limit value, measuring procedure, overall uncertainty, precision, specified measuring range, true value, validation:

Definitions for these terms are as in EN 1540.

4.2 Measurement terms

4.2.1 analysis

all operations carried out after sample preparation to determine the amount or concentration of the metals or metalloids of interest present in the sample

4.2.2 analytical method

all steps of the measuring procedure that describe the overall process of sample preparation and analysis

4.2.3 sampling method

all steps of the measuring procedure that describe the process of collecting an air sample

Bestelformulier

NEN

Stuur naar:

NEN Standards Products & Services
t.a.v. afdeling Klantenservice
Antwoordnummer 10214
2600 WB Delft

NEN Standards Products & Services

Postbus 5059
2600 GB Delft

Vlinderweg 6
2623 AX Delft

T (015) 2 690 390
F (015) 2 690 271

www.nen.nl/normshop

Ja, ik bestel

___ ex. NEN-EN 13890:2000 Ontw. en Werkplekatmosfeer - Procedures voor
het meten van metalen en metalloïden in in de lucht verspreide deeltjes -
Eisen en beproevingsmethoden € 23.85

**Wilt u deze norm in PDF-formaat? Deze bestelt u eenvoudig via
www.nen.nl/normshop**

Gratis e-mailnieuwsbrieven

Wilt u op de hoogte blijven van de laatste ontwikkelingen op het gebied van normen,
normalisatie en regelgeving? Neem dan een gratis abonnement op een van onze
e-mailnieuwsbrieven. www.nen.nl/nieuwsbrieven

Retourneren

Fax: (015) 2 690 271
E-mail: klantenservice@nen.nl
Post: NEN Standards Products
& Services,
t.a.v. afdeling Klantenservice
Antwoordnummer 10214,
2600 WB Delft
(geen postzegel nodig).

Gegevens

Bedrijf / Instelling _____

T.a.v. _____ O M O V

E-mail _____

Klantnummer NEN _____

Uw ordernummer _____ BTW nummer _____

Postbus / Adres _____

Postcode _____ Plaats _____

Telefoon _____ Fax _____

Factuuradres (indien dit afwijkt van bovenstaand adres)

Postbus / Adres _____

Postcode _____ Plaats _____

Datum _____ Handtekening _____

Voorwaarden

- De prijzen zijn geldig tot 31 december 2016, tenzij anders aangegeven.
- Alle prijzen zijn excl. btw, verzend- en handelingskosten en onder voorbehoud bij o.m. ISO- en IEC-normen.
- Bestelt u via de normshop een pdf, dan betaalt u geen handeling en verzendkosten.
- Meer informatie: telefoon (015) 2 690 391, dagelijks van 8.30 tot 17.00 uur.
- Wijzigingen en typfouten in teksten en prijsinformatie voorbehouden.
- U kunt onze algemene voorwaarden terugvinden op: www.nen.nl/leveringsvoorwaarden.