

This is a preview of "BS EN ISO 23320:2022". [Click here to purchase the full version from the ANSI store.](#)



BSI Standards Publication

**Workplace air — Gases and vapours —
Requirements for evaluation of measuring
procedures using diffusive samplers**

This is a preview of "BS EN ISO 23320:2022". [Click here to purchase the full version from the ANSI store.](#)

National foreword

This British Standard is the UK implementation of EN ISO 23320:2022. It is identical to ISO 23320:2022. It supersedes BS EN 838:2010, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee EH/2/2, Work place atmospheres.

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

Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

© The British Standards Institution 2022
Published by BSI Standards Limited 2022

ISBN 978 0 539 12745 4

ICS 13.040.30

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 June 2022.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

EUROPÄISCHE NORM

May 2022

ICS 13.040.30

Supersedes EN 838:2010

English Version

Workplace air - Gases and vapours - Requirements for evaluation of measuring procedures using diffusive samplers (ISO 23320:2022)

Air des lieux de travail - Gazes et vapeurs - Exigences pour l'évaluation des procédures pour le mesurage à l'aide de dispositifs de prélèvement par diffusion (ISO 23320:2022)

Luft am Arbeitsplatz - Gase und Dämpfe - Anforderungen an die Evaluierung von Messverfahren mit Diffusionssammlern (ISO 23320:2022)

This European Standard was approved by CEN on 13 March 2022.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

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



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

This is a preview of "BS EN ISO 23320:2022". [Click here to purchase the full version from the ANSI store.](#)

Contents		Page
Foreword		iv
Introduction		v
1 Scope		1
2 Normative references		1
3 Terms and definitions		1
4 Symbols and abbreviated terms		1
5 Types of samplers		3
6 Requirements		3
6.1 General.....		3
6.2 Sampler requirements.....		3
6.2.1 Nominal uptake rate.....		3
6.2.2 Air velocity/sampler orientation.....		3
6.2.3 Sampler leak test.....		4
6.2.4 Shelf life.....		4
6.2.5 Sampler identification (for commercially available diffusive samplers).....		4
6.2.6 Marking.....		4
6.2.7 Instructions for use.....		4
6.3 Measuring procedure requirements.....		5
6.3.1 Sampling procedure requirements.....		5
6.3.2 Analytical procedure requirements.....		5
6.3.3 Expanded uncertainty.....		6
6.3.4 Method description.....		6
7 General test conditions		7
7.1 Reagents.....		7
7.2 Apparatus.....		7
7.3 Independent method.....		7
7.4 Generation of a calibration gas mixture.....		8
7.4.1 General.....		8
7.4.2 Determination of mass concentration.....		8
8 Test methods		9
8.1 General.....		9
8.2 Sampler test methods.....		9
8.2.1 Determination of (nominal) uptake rate.....		9
8.2.2 Air velocity.....		10
8.2.3 Sampler leak test.....		11
8.2.4 Shelf life (for Type A impregnated supports).....		11
8.2.5 Sampler identification.....		12
8.2.6 Marking.....		12
8.2.7 Instructions for use.....		12
8.3 Measuring procedure test methods.....		12
8.3.1 Determination of the sampling conditions.....		12
8.3.2 Analytical procedure test methods.....		13
8.3.3 Method recovery and method precision.....		15
8.4 Uncertainty of measurement.....		17
8.4.1 Identification of random and non-random uncertainty components.....		17
8.4.2 Estimation of individual uncertainty components.....		17
8.4.3 Calculation of expanded uncertainty.....		18
9 Test report		19
Annex A (informative) Fundamentals of diffusive sampling		20
Annex B (informative) Estimation of uncertainty of measurement		22

This is a preview of "BS EN ISO 23320:2022". [Click here to purchase the full version from the ANSI store.](#)

Annex C (informative) Calculation of uptakes rates from diffusion coefficients	32
Annex D (informative) Example of estimation of expanded uncertainty	34
Bibliography	37

This is a preview of "BS EN ISO 23320:2022". Click here to purchase the full version from the ANSI store.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 2, *Workplace atmospheres*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 137, *Assessment of workplace exposure to chemical and biological agents*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

This is a preview of "BS EN ISO 23320:2022". [Click here to purchase the full version from the ANSI store.](#)

Introduction

This document provides a framework for assessing the performance of procedures for measuring gases and vapours against the general requirements for the performance of procedures for measuring chemical agents in workplace atmospheres as specified in ISO 20581. These performance criteria include maximum values of expanded uncertainty achievable under prescribed laboratory conditions for the methods to be used.

This document enables manufacturers and users of diffusive samplers and developers and users of procedures for measuring gases and vapours to adopt a consistent approach to method validation.

This document is based on EN 838:2010, published by the European Committee for Standardization (CEN) and is also complementary to ISO 16107.

This is a preview of "BS EN ISO 23320:2022". [Click here to purchase the full version from the ANSI store.](#)

This is a preview of "BS EN ISO 23320:2022". [Click here to purchase the full version from the ANSI store.](#)

Workplace air — Gases and vapours — Requirements for evaluation of measuring procedures using diffusive samplers

1 Scope

This document specifies performance requirements and test methods under prescribed laboratory conditions for the evaluation of diffusive samplers (see Reference [1]) and of procedures using these samplers for the determination of gases and vapours in workplace atmospheres (see Reference [2]).

This document is applicable to diffusive samplers and measuring procedures using these samplers, such as ISO 16200-2 and ISO 16017-2, in which sampling and analysis are carried out in separate stages.

This document is not applicable to

- diffusive samplers which are used for the direct determination of concentrations, and
- diffusive samplers which rely on sorption into a liquid.

This document addresses requirements for method developers and/or manufacturers.

NOTE For the purposes of this document a manufacturer can be any commercial or non-commercial entity.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 20581, *Workplace air — General requirements for the performance of procedures for the measurement of chemical agents*

ISO 22065, *Workplace air — Gases and vapours — Requirements for evaluation of measuring procedures using pumped samplers*

ISO 18158, *Workplace air — Terminology*

ISO 8655-2, *Piston-operated volumetric apparatus — Part 2: Piston pipettes*

ISO 8655-6, *Piston-operated volumetric apparatus — Part 6: Gravimetric methods for the determination of measurement error*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 18158 and ISO 20581 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Symbols and abbreviated terms