

<b>STN</b>	<b>Pracovné ovzdušie Plyny a pary Požiadavky na hodnotenie postupov merania využívajúcich difúzne vzorkovače (ISO 23320: 2022)</b>	<b>STN EN ISO 23320</b>  83 3801
------------	--	--

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

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 08/22

Obsahuje: EN ISO 23320:2022, ISO 23320:2022

Oznámením tejto normy sa ruší  
STN EN 838 (83 3801) z mája 2010

**135314**

EUROPEAN STANDARD

**EN ISO 23320**

NORME EUROPÉENNE

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**

**EN ISO 23320:2022 (E)**

<b>Contents</b>	<b>Page</b>
<b>European foreword.....</b>	<b>3</b>

## **European foreword**

This document (EN ISO 23320:2022) has been prepared by Technical Committee ISO/TC 146 "Air quality" in collaboration with Technical Committee CEN/TC 137 "Assessment of workplace exposure to chemical and biological agents" 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 November 2022, and conflicting national standards shall be withdrawn at the latest by November 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 838:2010.

Any feedback and questions on this document should be directed to the users' national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: 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 the United Kingdom.

## **Endorsement notice**

The text of ISO 23320:2022 has been approved by CEN as EN ISO 23320:2022 without any modification.

# INTERNATIONAL STANDARD

# ISO 23320

First edition  
2022-04

---

---

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

*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*



Reference number  
ISO 23320:2022(E)

© ISO 2022

**ISO 23320:2022(E)****COPYRIGHT PROTECTED DOCUMENT**

© ISO 2022

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

	Page
<b>Foreword</b> .....	<b>v</b>
<b>Introduction</b> .....	<b>vi</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Symbols and abbreviated terms</b> .....	<b>1</b>
<b>5 Types of samplers</b> .....	<b>3</b>
<b>6 Requirements</b> .....	<b>3</b>
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
<b>7 General test conditions</b> .....	<b>7</b>
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
<b>8 Test methods</b> .....	<b>9</b>
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.....	19
<b>9 Test report</b> .....	<b>19</b>
<b>Annex A (informative) Fundamentals of diffusive sampling</b> .....	<b>20</b>
<b>Annex B (informative) Estimation of uncertainty of measurement</b> .....	<b>23</b>

**ISO 23320:2022(E)**

<b>Annex C (informative) Calculation of uptakes rates from diffusion coefficients .....</b>	<b>33</b>
<b>Annex D (informative) Example of estimation of expanded uncertainty .....</b>	<b>35</b>
<b>Bibliography .....</b>	<b>38</b>



## 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](http://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](http://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](http://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](http://www.iso.org/members.html).

## ISO 23320:2022(E)

### 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.

# 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*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**