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**Kakovost zunanjega zraka - Difuzijski vzorčevalniki za določanje koncentracij
plinov - Zahteve, metode validacije in uporaba**

Ambient air quality - Diffusive samplers for the determination of concentrations of gases -
Requirements, validation methods and use

Außenluft - Passivsammler zur Bestimmung der Konzentration von Gasen -
Anforderungen und Prüfverfahren

Sample Document

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ICS:

13.040.20 Kakovost okoljskega zraka Ambient atmospheres

oSIST prEN 13528:2026

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EUROPEAN STANDARD
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DRAFT
prEN 13528

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ICS

Will supersede EN 13528-1:2002, EN 13528-2:2002,
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English Version

**Ambient air quality - Diffusive samplers for the
determination of concentrations of gases - Requirements,
validation methods and use**

Außenluft - Passivsammler zur Bestimmung der
Konzentration von Gasen - Anforderungen und
Prüfverfahren

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prEN 13528 (E)**European foreword**

This document (prEN 13528:2026) has been prepared by Technical Committee CEN/TC 264 "Air Quality", the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 13528-1:2002, EN 13528-2:2002 and EN 13528-3:2004.

In comparison with the previous edition, the following technical modifications have been made:

- General review and reorganization of the content.

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Introduction

Diffusive samplers are used to determine the concentrations of gases in [ambient air](#). The measurement procedure involves two main steps: first, the collection of the compound of interest using a diffusive (passive) sampler; second, the extraction of the [analyte](#) from the sampler followed by its quantification.

Diffusive samplers can be applied to measurements related to the protection of the environment and human health, including:

- Analysis of trends in air quality to support legislative and policy objectives;
- Investigation of source–receptor relationships;
- Verification and [validation](#) of atmospheric models;
- Evaluation of emission reduction measures;
- Collection of exposure data for epidemiology or risk assessment;
- Citizen science projects;
- Identification of unknown analytes in air;
- Mapping of spatial variation of pollutant concentrations.

Diffusive sampling is an attractive alternative to fixed monitoring due to:

- Small sampler size, so that locations can be covered where fixed monitoring is difficult;
- No requirement for electrical power;
- Ability to cover areas with high spatial density;
- Cost effectiveness.

Diffusive samplers are particularly suitable for compounds of significant environmental and health relevance within the framework of regulatory air quality monitoring. Directive (EU) 2024/2881 [\[1\]](#) specifies which measurement methods (fixed measurement, modelling, indicative measurement, or objective estimation) are to be applied by Member States of the European Union in different situations, taking into account factors such as concentration levels and site characteristics. Diffusive sampling is most often used as indicative measurement, but it has also been used for fixed measurements by demonstrating equivalence with the reference method in accordance with the Guidance for the Demonstration of Equivalence (GDE) [\[2\]](#).

Passive sampling can be used to monitor air pollutants addressed in other frameworks, such as the 1999 UNECE Gothenburg Protocol [\[3\]](#) and the EU National Emissions Ceilings Directive, 2016/2284/EU [\[4\]](#).

This document is the framework standard for the *validation* [\(3.14\)](#) and use of diffusive samplers in the field of ambient air. The following documents describe the use of diffusive sampling for monitoring specific pollutants in ambient air:

- Nitrogen dioxide (NO₂) described in [EN 16339:2025](#) [\[5\]](#);
- Ammonia (NH₃) described in [EN 17346:2020](#) [\[6\]](#);
- Benzene measurements by thermal desorption described in [EN 14662-4:2005](#) [\[7\]](#);
- Benzene measurements by solvent desorption described in [EN 14662-5:2005](#) [\[8\]](#);
- Volatile organic compounds (VOCs) by thermal desorption described in [EN ISO 16017-2:2003](#) [\[9\]](#);

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- Ambient air — Standard method for the measurement of organic ozone precursor concentrations
— Part 6: Diffusive sampling of formaldehyde on DNPH followed by offline HPLC/UV;
- Ambient air — Standard method for the measurement of organic ozone precursor concentrations
— Part 4: Diffusive sampling followed by thermal desorption and gas chromatography.

Besides these standards for ambient air, there are other standards for indoor air and/or workplace exposure which include diffusive sampling:

- Formaldehyde (CH₂O) described in [ISO 16000-4:2011 \[10\]](#)
- Nitrogen dioxide (NO₂) described in [EN ISO 16000-15:2008 \[11\]](#);
- Volatile organic compounds (VOCs) by thermal desorption described in [EN ISO 16017-2:2003 \[9\]](#);
- Volatile organic compounds (VOCs) by solvent desorption/gas chromatography described in [ISO 16200-2:2000 \[12\]](#).

NOTE It is the user's primary responsibility to choose appropriate procedures or devices that meet the requirements in this document. One way of doing this is to obtain information or confirmation from the manufacturer. Type testing, or more generally, the assessment of performance criteria of procedures or devices, can be undertaken by the manufacturer, user, test house or research and development laboratory, as is most appropriate.

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1 Scope

This document specifies performance requirements, validation methods and provides general instructions on the use of diffusive samplers for the determination of the concentration of gases in ambient air.

This document applies to all stages of the measuring procedure, including preparation, deployment, transportation and storage. It includes general principles applicable to diffusive sampling and analysis. It enables manufacturers and users to adopt a consistent approach to sampler validation and provides a framework for the assessment of sampler performance.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

3.1

ambient air

outdoor air in the troposphere, excluding indoor air and workplaces

3.2

analyte

substance extracted from the sorbent and analysed to quantify the compound of interest

Note 1 to entry: The analyte may not always be the same as the original compound due to interactions with the sorbent.

3.3

sampling time

period of time for which the diffusive sampler is deployed to yield an average concentration of the pollutant

Note 1 to entry: The term *exposure period* is often used to indicate the sampling time.

3.4

bias

expectation of error of estimation

[SOURCE: [ISO 3534-1:2006 \[13\]](#)]

3.5

recovery

ratio of the mass of analyte recovered from a sampling device to that applied

3.6

diffusive sampler

device which is capable of taking samples of gases from the atmosphere at a rate controlled by a physical process such as gaseous diffusion through a static air layer or a porous material and/or permeation through a membrane, but which does not involve the active movement of air through the device

Note 1 to entry: *Active* normally refers to the pumped movement of air.