

Health and safety in welding and allied processes -  
Sampling of airborne particles and gases in the  
operator's breathing zone - Part 2: Sampling of gases  
(ISO 10882-2:2024)

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>See Eesti standard EVS-EN ISO 10882-2:2024 sisaldab Euroopa standardi EN ISO 10882-2:2024 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 08.05.2024.</p> <p>Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.</p>	<p>This Estonian standard EVS-EN ISO 10882-2:2024 consists of the English text of the European standard EN ISO 10882-2:2024.</p> <p>This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.</p> <p>Date of Availability of the European standard is 08.05.2024.</p> <p>The standard is available from the Estonian Centre for Standardisation and Accreditation.</p>
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EUROPEAN STANDARD

EN ISO 10882-2

NORME EUROPÉENNE

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Health and safety in welding and allied processes -  
Sampling of airborne particles and gases in the operator's  
breathing zone - Part 2: Sampling of gases (ISO 10882-  
2:2024)

Hygiène et sécurité en soudage et techniques connexes  
- Échantillonnage des particules en suspension et des  
gaz dans la zone respiratoire des opérateurs - Partie 2:  
Échantillonnage des gaz (ISO 10882-2:2024)

Arbeits- und Gesundheitsschutz beim Schweißen und  
bei verwandten Verfahren - Probenahme von  
partikelförmigen Stoffen und Gasen im Atembereich  
des Schweißers - Teil 2: Probenahme von Gasen (ISO  
10882-2:2024)

This European Standard was approved by CEN on 2 September 2023.

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

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

## European foreword

This document (EN ISO 10882-2:2024) has been prepared by Technical Committee ISO/TC 44 "Welding and allied processes" in collaboration with Technical Committee CEN/TC 121 "Welding and allied processes" the secretariat of which is held by AFNOR.

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 2024, and conflicting national standards shall be withdrawn at the latest by November 2024.

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.

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## Endorsement notice

The text of ISO 10882-2:2024 has been approved by CEN as EN ISO 10882-2:2024 without any modification.

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## 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 document 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)).

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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 44, *Welding and allied processes*, Subcommittee SC 9, *Health and safety*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 121, *Welding and allied processes*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 10882-2:2000), which has been technically revised.

The main changes are as follows:

- references to other documents have been updated;
- position of the personal sampler has been changed.

A list of all parts in the ISO 10882 series can be found on the ISO website.

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). Official interpretations of ISO/TC 44 documents, where they exist, are available from this page: <https://committee.iso.org/sites/tc44/home/interpretation.html>.

## Introduction

Gases encountered during welding and allied processes are so numerous that it would be impracticable to cover them all in this document. Depending on the process, they can include:

- a) fuel gases which are used in gas welding and cutting, which on combustion produce carbon dioxide and, in some instances, carbon monoxide;
- b) shielding gases, such as argon, helium, carbon dioxide or mixtures of these gases, which can be toxic or asphyxiant;
- c) gases produced by the action of heat upon the welding flux or slag, e.g. carbon dioxide and carbon monoxide;
- d) gases produced by the action of heat or ultraviolet radiation upon the atmosphere surrounding the welding arc, e.g. nitric oxide, nitrogen dioxide and ozone;
- e) vapours produced as a result of thermal degradation of surface coatings in the welding or cutting of metals treated with paint, primer, sealer or other substances. Vapours can also be produced as a result of degradation of solvent vapour from degreasing operations, but their measurement is not dealt with in this document because good working practices will avoid their production.

The scope of this document has been limited to those gases which are produced by welding operations. In particular, fuel, oxidant and shielding gases used in welding and allied processes are not covered, since the hazards associated with their use (e.g. asphyxiation, explosion) are different from those arising from the gases dealt with in this document.

This document gives a generalised description of measurement methods suitable for the assessment of personal exposure to gases produced by welding and allied processes; gives details of relevant European Standards which specify required characteristics, performance requirements and test methods; augments guidance provided in EN 689 on assessment strategy and measurement strategy; lists basic sampling requirements; and provides specific information about the availability of direct reading electrical apparatus, detector tubes and indirect methods involving laboratory analysis for individual gases.

It has been assumed in the drafting of this document that the execution of its provisions, and the interpretation of the results obtained, is entrusted to appropriately qualified and experienced people.

# Health and safety in welding and allied processes — Sampling of airborne particles and gases in the operator's breathing zone —

## Part 2: Sampling of gases

### 1 Scope

This document provides guidance and specifications for the determination of personal exposure to gases and vapours in welding and allied processes. It applies to the following thermal processes used to join, cut, surface or remove metals:

- (111) Manual metal arc welding (metal arc welding with covered electrode); shielded metal arc welding /USA/
- (114) Self-shielded tubular-cored arc welding
- (131) Metal inert gas welding; MIG welding; gas metal arc welding /USA/
- (135) Metal active gas welding; MAG welding; gas metal arc welding /USA/
- (136) Tubular-cored metal arc welding with active gas shield; flux cored arc welding /USA/
- (137) Tubular-cored metal arc welding with inert gas shield; flux cored arc welding /USA/
- (141) Tungsten inert gas arc welding; TIG welding; gas tungsten arc welding /USA/
- (15) Plasma arc welding;
- (31) Oxy-fuel gas welding; oxy-fuel gas welding /USA/
- (52) Laser beam welding;
- (912) Flame brazing; torch brazing /USA/
- (97) Braze welding;
  - arc and flame gouging;
  - arc and laser cutting processes;
  - flame and plasma cutting processes;
  - metal-spraying (see ISO 4063).

The following gases and vapours which can be produced or be present during welding and allied processes are covered:

- ozone (O<sub>3</sub>);
- carbon monoxide (CO);
- carbon dioxide (CO<sub>2</sub>);
- nitric oxide (NO) and nitrogen dioxide (NO<sub>2</sub>);

— vapours produced in the welding or cutting of metals having paint or other surface coatings.

Fuel, oxidant and shielding gases used in welding and allied processes are not covered.

The general background level of gases and vapours in the workplace atmosphere influences personal exposure, and therefore the role of fixed-point measurements is also considered.

## 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 10882-1:2024, *Health and safety in welding and allied processes — Sampling of airborne particles and gases in the operator's breathing zone — Part 1: Sampling of airborne particles*

EN 482, *Workplace exposure — Procedures for the determination of the concentration of chemical agents — Basic performance requirements*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10882-1 and the following apply.

ISO and IEC maintain terminology 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/>

### 3.1 General terms

#### 3.1.1

##### **work pattern**

sequence of activities carried out by the worker during the period under consideration

#### 3.1.2

##### **workplace**

designated area or areas in which the work activities are carried out

[SOURCE: ISO 18158:2016, 2.1.6.2]

### 3.2 Measurement terms

#### 3.2.1

##### **diffusive detector tube**

diffusion tube, similar in construction to a pumped detector tube

Note 1 to entry: The length of the stain produced provides a measure of the exposure dose of a specified chemical agent in air, stated in ppm hours.

#### 3.2.2

##### **pumped detector tube**

glass tube containing chemical reagents in which a colour change can be produced when a sample of the atmosphere is drawn through it

Note 1 to entry: The length of the stain produced provides a measure of the concentration of a specified chemical agent in air.