



SLOVENSKI STANDARD
oSIST prEN ISO 10882-2:2023
01-julij-2023

Varnost in zdravje pri varjenju in sorodnih postopkih - Vzorčenje prahu in plinov iz dihalnega območja varilca - 2. del: Vzorčenje plinov (ISO/DIS 10882-2:2023)

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/DIS 10882-2:2023)

iTeh STANDARD PREVIEW

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/DIS 10882-2:2023)

oSIST prEN ISO 10882-2:2023

Hygiène et sécurité en soudage et techniques connexes - Échantillonnage de particules en suspension et gaz dans la zone respiratoire des opérateurs - Partie 2: Échantillonnage des gaz (ISO/DIS 10882-2:2023)

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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

Hygiène et sécurité en soudage et techniques connexes — Échantillonnage de particules en suspension et gaz dans la zone respiratoire des opérateurs —

Partie 2: Échantillonnage des gaz

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

Throughout the text of this standard, read "...this European Standard..." to mean "...this International Standard...".

[Annexes A](#) and [B](#) of this part of ISO 10882 are for information only.

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

The main changes compared to the previous edition are as follows:

- The references to other documents have been updated.
- The 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.

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Introduction

Gases encountered during welding and allied processes are so numerous that it would be impracticable to cover them all in this European Standard. 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; and
- 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 standard because good working practices will avoid their production.

The scope of this part of ISO 10882 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 guide.

This part of ISO 10882 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 standard 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 part of ISO 10882 provides guidance 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, plasma and laser 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 (O₃);
- carbon monoxide (CO);
- carbon dioxide (CO₂);

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- nitric oxide (NO) and nitrogen dioxide (NO₂);
- 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.

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

EN 689, *Workplace exposure — Measurement of exposure by inhalation to chemical agents — Strategy for testing compliance with occupational exposure limit values*

EN 838, *Workplace exposure — Procedures for measuring gases and vapours using diffusive samplers — Requirements and test methods*

EN 1540, *Workplace atmospheres — Terminology*

EN 45544-1, *Workplace atmospheres — Electrical apparatus for the direct detection and direct concentration measurement of toxic gases and vapours — Part 1: General requirements and test methods*

ISO 8756, *Air quality — Handling of temperature, pressure and humidity data*

ISO 10882-1, *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*

ISO 13137, *Workplace atmospheres — Pumps for personal sampling of chemical and biological agents — Requirements and test methods*

ISO 17621, *Workplace atmospheres — Short term detector tube measurement systems — Requirements and test methods*

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

3 Terms and definitions

For the purposes of this document, the terms and definition 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

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

[SOURCE: EN 1540]

3.1.2

workplace

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

[SOURCE: EN 1540]

3.2 Measurement terms

3.2.1

diffusive detector tube

a diffusion tube, similar in construction to a pumped detector tube. 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

a glass tube containing chemical reagents in which a colour change may be produced when a sample of the atmosphere is drawn through it. The length of the stain produced provides a measure of the concentration of a specified chemical agent in air

3.2.3

diffusion tube

diffusive tube

tube type diffusive sampler

a diffusive sampler with a cross-sectional area which is small in relation to the internal air gap, across which the gas or vapour passes by diffusion to the sorbent

3.2.4

diffusive badge

badge type diffusive sampler

passive badge

a diffusive sampler in which the gas or vapour passes to the sorbent by permeation through a thin solid membrane or diffusion across a porous membrane. The cross-sectional area is large in relation to the internal air gap

3.2.5

diffusive sampler

passive sampler

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

[SOURCE: EN 838]

3.2.6

direct reading electrical apparatus

direct reading instrument

apparatus in which the presence of a gas or vapour causes a change that is manifest as an automatically generated electrical signal. When applied to a calibrated indicating or recording meter, this gives a direct measure of the concentration of the relevant gas or vapour.

3.2.7

fixed apparatus

an apparatus which is intended to have all parts permanently installed

[SOURCE: EN 45544-1]