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

Part 2: Sampling of gases

**Part 2:
Sampling of gases**

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

ISO/PRF 10882-2

Partie 2: Échantillonnage des gaz <https://standards.iteh.ai/catalog/standards/iso/951c0456-4065-483b-bd82-94b03f18e825/iso-prf-10882-2>

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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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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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.

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. 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) ~~a)~~ fuel gases which are used in gas welding and cutting, which on combustion produce carbon dioxide and, in some instances, carbon monoxide;
- b) ~~b)~~ shielding gases, such as argon, helium, carbon dioxide or mixtures of these gases, which can be toxic or asphyxiant;
- c) ~~c)~~ gases produced by the action of heat upon the welding flux or slag, e.g. carbon dioxide and carbon monoxide;
- d) ~~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) ~~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~~operator's breathing zone — **Part 2: Sampling of gases**

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 (O₃);
- carbon monoxide (CO);
- carbon dioxide (CO₂);
- nitric oxide (NO) and nitrogen dioxide (NO₂);