
**Workplace air — General
requirements for the performance of
procedures for the measurement of
chemical agents**

*Air des lieux de travail — Exigences générales concernant les
performances des procédures de mesure des agents chimiques*

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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).

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For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 146, *Air quality*, Subcommittee SC 2, *Workplace atmospheres*.

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Introduction

National laws and regulations require the assessment of the potential exposure of a worker to chemical agents in workplace atmospheres. One way of assessing such exposure is to measure the concentration of a chemical agent in the air in the worker's breathing zone. The procedures used for such measurements should provide reliable and valid results for the comparison purpose of exposure measurements with occupational exposure limit values and for the provision of acceptable control strategies.

This document is based on EN 482:2012, amended by Amendment 1:2015, and introduces general requirements to fulfil the measurement procedures in the process of quantitative exposure assessment. Specific International Standards and European Standards have been prepared for different types of measuring procedures and measuring devices. These include standards for airborne particle samplers [EN 13205 (all parts)], diffusive samplers (ISO 16107 and EN 838), pumped samplers (EN 1076), short-term detector tubes (ISO 17621), personal sampling pumps (ISO 13137), metals and metalloids in airborne particles (EN 13890), mixtures of airborne particles and vapour (EN 13936) and direct reading instruments for toxic gases and vapours [EN 45544 (all parts)]. In these specific standards, additional requirements have been included for the procedure or device in question, so that the general requirements of this document are not compromised. Where no specific International and/or European Standard exists, only the general requirements apply.

Performance requirements given in this document are intended to apply under environmental conditions present at the workplace. However, because a wide range of environmental conditions is encountered in practice, this document specifies requirements that have to be fulfilled by measuring procedures when tested under prescribed laboratory conditions.

It is the user's responsibility to choose the appropriate procedures or devices that meet the requirements of this document. One way of doing this is to obtain information or confirmation from the provider of a procedure or the manufacturer of a device. Type-testing or, more generally, assessment of the performance of procedures or devices, can be undertaken by the manufacturer, user, testing house or research and development laboratory, as is most appropriate. A number of existing procedures for workplace measurements have either been tested over a part of the required minimum measuring range, but not over the entire range, or have not been tested for all environmental influences and potential interferences. If these partially validated procedures meet the performance requirements of this document, they can be used at present. Nevertheless, these procedures should be tested over the full ranges as soon as is reasonably practicable.

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Workplace air — General requirements for the performance of procedures for the measurement of chemical agents

1 Scope

This document specifies general performance requirements for procedures for the determination of the concentration of chemical agents in workplace atmospheres. These requirements apply to all steps of measuring procedures regardless of the physical form of the chemical agent (gas, vapour, airborne particles), measuring procedures with separate sampling and analytical methods, and direct-reading devices.

This document specifies requirements that have to be fulfilled by measuring procedures when tested under prescribed laboratory conditions due to a wide range of environmental conditions encountered in practice.

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 78-2, *Chemistry — Layouts for standards — Part 2: Methods of chemical analysis*

ISO 7708, *Air quality — Particle size fraction definitions for health-related sampling*

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

ISO 16107, *Workplace atmospheres — Protocol for evaluating the performance of diffusive samplers*

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

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

EN 1076, *Workplace exposure — Procedures for measuring gases and vapours using pumped samplers — Requirements and test methods*

EN 13205 (all parts), *Workplace exposure — Assessment of sampler performance for measurement of airborne particle concentrations*

EN 13890, *Workplace exposure — Procedures for measuring metals and metalloids in airborne particles — Requirements and test methods*

EN 13936, *Workplace exposure — Procedures for measuring a chemical agent present as a mixture of airborne particles and vapour — Requirements and test methods*

EN 45544 (all parts), *Workplace atmospheres — Electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours*