
**Sampling airborne radioactive
materials from the stacks and ducts of
nuclear facilities**

*Échantillonnage de substances radioactives en suspension dans l'air
dans les émissaires de rejet et les conduits des installations nucléaires*



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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 Technical Committee ISO/TC 85, *Nuclear energy nuclear technologies and radiological protection*, Subcommittee SC 2, *Radiation protection*.

This third edition cancels and replaces the second edition (ISO 2889:2010), which has been technically revised. The main changes are:

- clarification of the circumstances where numerical modelling may be used to perform or assist with meeting the qualifications for sample extraction locations;
- clarification of passages allowing the use of alternate aerosol particle sizes for the purpose of testing to meet various performance criteria described in this document;
- changes for the discussion of standard uncertainty with regard to setting action levels ([Annex I](#)).

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.

Introduction

This document focuses on monitoring the activity concentrations and activity releases of radioactive substances in air in stacks and ducts. Other situations for monitoring the activity concentrations and activity releases of radioactive substances in air (environmental or workplace monitoring) are being addressed in subsequent standards. This document provides performance-based criteria for the use of air-sampling equipment, including probes, transport lines, sample collectors, sample monitoring instruments and gas flow measuring methods. This document also provides information covering sampling programme objectives, quality assurance, development of air monitoring control action levels, system optimization and system performance verification.

ISO 2889 was first published in 1975 as a guide to sampling airborne radioactive materials in the ducts, stacks, and working environments of installations where work with radioactive materials is conducted. Since then, an improved technical basis has been developed for each of the major sampling specialities. The focus of this document is on the sampling of airborne radioactive materials in ducts and stacks.

The goal of achieving an unbiased, representative sample is best accomplished where samples are extracted from airstreams in which potential airborne contaminants are well mixed in the airstream. This document sets forth performance criteria and recommendations to assist in obtaining valid measurements of the concentration of airborne radioactive materials in ducts or stacks.

Sampling airborne radioactive materials from the stacks and ducts of nuclear facilities

1 Scope

This document sets forth performance-based criteria and recommendations for the design and use of systems for sampling of airborne radioactive materials in the effluent air from the ducts and stacks of nuclear facilities.

The requirements and recommendations of this document are aimed at sampling that is conducted for regulatory compliance and system control. If existing air-sampling systems are not designed to the performance requirements and recommendations of this document, an evaluation of the performance of the system is advised. If deficiencies are discovered, a determination of whether or not a retrofit is needed and practicable is recommended.

It can be impossible to meet the requirements of this document in all conditions with a sampling system designed for normal operations only. Under off-normal conditions, the criteria or recommendations of this document still apply. However, for accident conditions, special accident air sampling systems or measurements can be used.

This document does not address outdoor air sampling, radon measurements, or the surveillance of airborne radioactive substances in the workplace of nuclear facilities.

NOTE Reference [1] addresses the instrumentation that is frequently used in nuclear air monitoring. Reference [5] addresses air sampling in the workplace of nuclear facilities. References [6] and [7] describe the performance characteristics of air monitors.

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 10780:1994, *Stationary source emissions — Measurement of velocity and volume flowrate of gas streams in ducts*

3 Terms and definitions

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

ISO and IEC maintain terminological 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

abatement equipment

apparatus used to reduce contaminant concentration in the airflow exhausted through a stack or duct