
**Stationary source emissions — Manual
determination of mass concentration
of particulate matter**

*Émissions de sources fixes — Détermination manuelle de la
concentration en masse de poussières*



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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 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by ISO Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 1, *Stationary source emissions*.

This third edition cancels and replaces the second edition (ISO 9096:2003), of which it constitutes a minor revision. It also incorporates the Technical Corrigendum ISO 9096:2003/Cor.1:2006. The changes compared to the previous edition are as follows:

- [Table 3](#): in the row entitled “Isokinetic criteria (average measurement uncertainty)” the value “±10 %” has been replaced by “ $_{-5}^{+15}$ %” (according to ISO 9096:2003/Cor.1:2006).
- [Formula \(11\)](#): the percent symbol has been added twice.
- [Formula \(13\)](#): the percent symbol has been added twice.
- [Figure A.2](#): < 0,2 has been corrected to > 0,2.
- [Formula \(B.6\)](#): the parentheses have been removed.
- [Formula \(B.7\)](#): the formula has been corrected.

Introduction

Close liaison and cooperation between ISO/TC 146/SC 1 and CEN/TC 264 has resulted in the preparation of this document, ISO 12141 and EN 13824-1. This document is similar to EN 13284-1 with additional emphasis given on the use of high-volume sampling techniques. A representative, integrated sample is extracted from the flue gas and the particulate matter entrained in the gas sample is separated by a filter. The pre-weighed filter is subsequently dried and weighed. A relative increase in the mass is attributed to the collection of particulate matter on the filter.

To meet the specifications of this document, the particulate sample is weighed to a specified level of accuracy. This level of accuracy is achieved by:

- a) exercising extreme care in weighing, in accordance with the procedures of this document;
- b) extending the sampling time at conventional sampling rates;
- c) sampling at higher rates for conventional sampling times (high-volume sampling);
- d) recovering all dust upstream of the filter.

Stationary source emissions — Manual determination of mass concentration of particulate matter

1 Scope

This document describes a reference method for the measurement of particulate matter (dust) concentration in waste gases of concentrations from 20 mg/m³ to 1 000 mg/m³ under standard conditions.

This document is applicable to the calibration of automated monitoring systems (AMS). If the emission gas contains unstable, reactive or semi-volatile substances, the measurement will depend on the filtration temperature. In-stack methods can be more applicable than out-stack methods for the calibration of automated monitoring systems.

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 5725 (all parts), *Accuracy (trueness and precision) of measurement methods and results*

ISO 10780, *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 <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

particulate matter

dust

particles, of any shape, structure or density, dispersed in the gas phase under the sampling conditions

Note 1 to entry: In the method described, all the compounds that may be collected by filtration under specified conditions after representative sampling of the gas to be analysed, and which remain upstream of the filter and on the filter after drying under specified conditions, are considered to be dust (or particulate matter). However, for the purposes of some national standards, the definition of particulate matter can extend to condensibles or reaction products collected under specified conditions (e.g. temperatures lower than the flue gas temperature).

Note 2 to entry: This method restricts the definition of particulate matter to that material collected in the sampling system on and before a filter, under specified temperature conditions. Procedures for the measurement of secondary particulate matter (condensable materials) formed and collected after the filter are not within the scope of this document.

3.2

filtration temperature

temperature of the sampled gas immediately downstream of the filter