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**Workplace atmospheres —  
Controlling and characterizing  
uncertainty in weighing collected  
aerosols**

*Air des lieux de travail — Contrôle et caractérisation de l'incertitude de pesée des aérosols collectés*



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 15767 was prepared by Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 2, *Workplace atmospheres*.

This second edition cancels and replaces the first edition (ISO 15767:2003), which has been technically revised.

## Introduction

Assessment of airborne aerosol hazards in occupational settings entails sampling onto a collection substrate, followed by analysis of the collected material. The weight of the collection substrate is generally many times (10 to 20, or more) larger than the aerosol sample. Weighing the aerosol sample is therefore actually the differential weighing of the substrate, where the aerosol sample is essentially a disturbance of the substrate. The result is generally an estimated concentration of a hazardous material in the air. The uncertainty in such estimates depends on several factors, one of which relates to the specific type of analysis employed.

This International Standard deals with a specific type of analysis which finds the most general application in the sampling of aerosols, namely the weighing of sampled material. Gravimetric analysis, though apparently simple, is subject to uncertainty arising from instability in the mass of the sampling medium and other elements which must be weighed. An example is provided by aerosol samplers designed to collect particles so as to agree with the inhalable aerosol sampling convention. For some sampler types, the filter and cassette are weighed together to make estimates. Therefore, uncertainty may result if the cassette, for example, absorbs or loses water between the weighings required for a concentration estimation. This International Standard describes such uncertainty and provides solutions for minimization.

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# Workplace atmospheres — Controlling and characterizing uncertainty in weighing collected aerosols

## 1 Scope

This International Standard provides recommendations for controlling the analytical uncertainty associated with aerosol collection medium instability, where collection medium or collection substrate includes any article used to collect particles (e.g. filter or foam material) as well as those supporting elements which must be analysed by weighing.

This International Standard is applicable to results compiled both from the literature and, if necessary and feasible, through laboratory experiment. Expected uncertainty associated with given aerosol capture methods is quantified where possible. Recommendations as to materials to be used are given. Means of minimizing uncertainty arising from instability are provided. Recommendations for the weighing procedure are given. A procedure for estimating weighing uncertainty is described. Finally, recommendations are given for the reporting of measured mass, including an uncertainty component and limits of detection and quantification.

## 2 Terms and definitions

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

### 2.1

#### **aerosol sample**

aerosol particles collected onto the collection substrate or sampling cassette

### 2.2

#### **collection substrate**

aerosol sampling filter, foam, impaction plate or other deposition plate designed for subsequent analysis, with whatever mounting, e.g. a sampling cassette, if used, analysed (weighed) as a single item together with the collected aerosol sample, if present

**NOTE** As an example of the converse, the 25 mm or 37 mm plastic filter holder often used for “total dust” sampling in either its closed-face or open-face version is not part of the collection substrate in the definition above, since it is not weighed.

### 2.3

#### **substrate holder**

cassette primarily designed to hold a collection substrate (of any kind) and for which only the deposit on the collection substrate is analysed (weighed)

### 2.4

#### **filter holder**

substrate holder designed to hold a filter and for which only the filter deposit is analysed (weighed)

### 2.5

#### **sampling cassette**

collection substrate together with whatever mounting that is used and analysed (weighed) as a single unit