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**High-efficiency filters and filter media for  
removing particles in air —**

**Part 5:  
Test method for filter elements**

*Filtres à haut rendement et filtres pour l'élimination des particules dans  
l'air —*

*Partie 5: Méthode d'essai des éléments filtrants*



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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 29463-5 was prepared by Technical Committee ISO/TC 142, *Cleaning equipment for air and other gases*.

ISO 29463 consists of the following parts, under the general title *High-efficiency filters and filter media for removing particles in air*:

- *Part 1: Classification, performance, testing and marking*
- *Part 2: Aerosol production, measuring equipment, particle-counting statistics*
- *Part 3: Testing flat sheet filter media*
- *Part 4: Test method for determining leakage of filter element — Scan method*
- *Part 5: Test method for filter elements*

## Introduction

ISO 29463 (all parts) is derived from EN 1822 (all parts) with extensive changes to meet the requests from non-EU p-members. It contains requirements, fundamental principles of testing and the marking for high-efficiency particulate air filters with efficiencies from 95 % to 99,999 995 % that can be used for classifying filters in general or for specific use by agreement between users and suppliers.

ISO 29463 (all parts) establishes a procedure for the determination of the efficiency of all filters on the basis of a particle counting method using a liquid (or alternatively a solid) test aerosol, and allows a standardized classification of these filters in terms of their efficiency, both local and overall efficiency, which actually covers most requirements of different applications. The difference between ISO 29463 (all parts) and other national standards lies in the technique used for the determination of the overall efficiency. Instead of mass relationships or total concentrations, this technique is based on particle counting at the most penetrating particle size (MPPS), which is, for micro-glass filter mediums, usually in the range of 0,12  $\mu\text{m}$  to 0,25  $\mu\text{m}$ . This method also allows testing ultra-low-penetration air filters, which was not possible with the previous test methods because of their inadequate sensitivity. For membrane filter media, separate rules apply, and are described in Annex B. Although no equivalent test procedures for testing filters with charged media is prescribed, a method for dealing with these types of filters is described in Annex C. Specific requirements for testing method, frequency, and reporting requirements can be modified by agreement between supplier and customer. For lower-efficiency filters (group H, as described below), alternate leak test methods described in ISO 29463-4:2011, Annex A, can be used by specific agreement between users and suppliers, but only if the use of these other methods is clearly designated in the filter markings as noted in ISO 29463-4:2011, Annex A.

There are differences between ISO 29463 (all parts) and other normative practices common in several countries. For example, many of these rely on total aerosol concentrations rather than individual particles. For information, a brief summary of these methods and their reference standards are provided in Annex D of this part of ISO 29463.



# High-efficiency filters and filter media for removing particles in air —

## Part 5: Test method for filter elements

### 1 Scope

This part of ISO 29463 specifies the reference test procedure for determining the efficiency of filters at their most penetrating particle size (MPPS). It also gives guidelines for the testing and classification for filters with an MPPS of less than 0,1  $\mu\text{m}$  (Annex B) and filters using media with (charged) synthetic fibres (Annex C). It is intended for use in conjunction with ISO 29463-1, ISO 29463-2, ISO 29463-3 and ISO 29463-4.

### 2 Normative references

The following referenced documents are indispensable for the application 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 5167-1, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 1: General principles and requirements*

ISO/TS 21220:2009, *Particulate air filters for general ventilation — Determination of filtration performance*

ISO 21501-4, *Determination of particle size distribution — Single particle light interaction methods — Part 4: Light scattering airborne particle counter for clean spaces*

ISO 29463-1:2011, *High-efficiency filters and filter media for removing particles in air — Part 1: Classification, performance, testing and marking*

ISO 29463-2:2011, *High-efficiency filters and filter media for removing particles in air — Part 2: Aerosol production, measuring equipment, particle-counting statistics*

ISO 29463-3, *High-efficiency filters and filter media for removing particles in air — Part 3: Testing flat sheet filter media*

ISO 29463-4:2011, *High-efficiency filters and filter media for removing particles in air — Part 4: Test method for determining the leakage of filter elements — Scan method*

ISO 29464<sup>1)</sup>, *Cleaning equipment for air and other gases — Terminology*

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