
**Sampling and test method for
cleanable filter media taken from
filters of systems in operation**

*Échantillonnage et méthode d'essai pour médias filtrants
décolmatables prélevés sur des filtres de systèmes en exploitation*



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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 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 142, *Cleaning equipment for air and other gases*.

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

The main purpose of using dust collector systems is to remove dust particles from dirty gases. The dry type filtering dust collectors, known as bag filters, are one of the most widespread industrial dust collectors and are used in applications such as municipal garbage incinerators, coal fired boilers, iron making, cement factories, power plants, etc. Especially, in municipal garbage incinerators, bag filters have been used frequently to overcome dioxin emission^{[1],[2]}.

Since filter media are used under various gas and dust conditions for a long time, their physical and chemical properties change (deteriorate) with operating time due to various causes^{[3]-[12]}. The important filter characteristics such as collection performance and residual pressure drop change with the operation period. Since users of bag filter systems have usually evaluated the parameters associated with the change in the filter properties with their own methods, the results obtained were not easily compared with each other. For this reason, the establishment of a standard for operation, management, and maintenance of filter systems is important to allow prediction of the timing of replacement and/or service life time of filter media.

Changes in the physical and chemical properties of the filter medium, i.e., physical and chemical degradation are caused by many factors, such as heat, particle accumulation, reaction with corrosive gases and deposited particles, and mechanical reasons like clogged weave openings and increasing size of weave openings, the combination of those factors and so on. The filter medium damage can be analysed through the fault tree analysis in [Annex A](#). Clogged weave openings reduce the permeability of the filter medium; and increasing the size of weave openings lessens the collection performance of the filter medium. The reaction with corrosive gases and deposited particles changes properties of the filter fibre material itself and decreases the tensile strength, tenacity, flexibility of the filter medium and so on. These changes cause mostly adverse effects to the filter medium. This can result in the breakage of filter media and leakage of dust to the atmosphere.

Therefore, since it is important to evaluate the property changes of filter media in order to predict the timing of replacement and/or service life time, ISO 16891, which specifies test methods for evaluating degradation of tensile stress of cleanable filter media, has been published. However, test methods for other evaluation parameters such as permeability, collection efficiency, fibre diameter of used filter media, mass and size distribution of deposited particles, have not yet been specified.

Industrial bag filter systems, in general, handle large amounts of dirty gas so that a system with a large number of filter elements in parallel is needed to remove the dust. The degree of degradation of filter properties depends on the location of the filter in the system because the dirty gas usually enters the system in an irregular flow pattern. Furthermore, the method used for sampling and storage of the used filter, and the preparation method of the test specimen should be defined. By standardizing these test methods, it is possible to accurately assess the deterioration of individual filter media.

This document provides a standard method for sampling filter elements from a dust collector system in operation, and a test method for monitoring sampled filter elements and the system through measurement of basic filter properties.

Sampling and test method for cleanable filter media taken from filters of systems in operation

1 Scope

This document specifies a method for sampling fabric filter medium from a filter system in operation, and a test method for evaluating the degradation of the sampled filter medium. It applies to both woven and nonwoven fabric filter media.

This document specifies a method for removing used filter medium from a dry type filtering dust collector, a method for removing dust from the sampled filter medium as part of preparation for testing, and measurement parameters for the test specimen. The number of filter elements to be sampled, their positions in the blocks of filter elements in the dust collector, the position and the size of the test specimens to be cut out from the filter element, measurement parameters and their test methods are also specified.

This document also specifies a storage and transportation method for the sampled filter medium that will protect the health of workers and people conducting the tests.

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 9237, *Textiles — Determination of the permeability of fabrics to air*

ISO 16891:2016, *Test methods for evaluating degradation of characteristics of cleanable filter media*

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 <http://www.electropedia.org/>

3.1

air permeability

gas volume flow rate per unit filtration area at pressure drop of 124,5 Pa

[SOURCE: ISO 16891:2016, 3.2]

3.2

cleanable filter

filter designed to permit the removal of collected dust by application of an appropriate technique

[SOURCE: ISO 29464:2017, 3.2.73, modified — Note 1 to entry has been removed.]