



NSAI
Standards

Irish Standard
I.S. EN ISO 16891:2016

Test methods for evaluating degradation of characteristics of cleanable filter media (ISO 16891:2016)

I.S. EN ISO 16891:2016

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National Foreword

I.S. EN ISO 16891:2016 is the adopted Irish version of the European Document EN ISO 16891:2016, Test methods for evaluating degradation of characteristics of cleanable filter media (ISO 16891:2016)

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EUROPEAN STANDARD

EN ISO 16891

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2016

ICS 91.140.30

English Version

Test methods for evaluating degradation of characteristics of cleanable filter media (ISO 16891:2016)

Méthodes d'essais pour l'évaluation de la dégradation
des propriétés des médias filtrants décolmables (ISO
16891:2016)

Prüfmethode zur Ermittlung der Abnahme der
Wirksamkeit von abreinigbaren Filtermedien (ISO
16891:2016)

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EN ISO 16891:2016 (E)

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European foreword

This document (EN ISO 16891:2016) has been prepared by Technical Committee ISO/TC 142 "Cleaning equipment for air and other gases" in collaboration with Technical Committee CEN/TC 195 "Air filters for general air cleaning" the secretariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2016, and conflicting national standards shall be withdrawn at the latest by August 2016.

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The text of ISO 16891:2016 has been approved by CEN as EN ISO 16891:2016 without any modification.

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INTERNATIONAL STANDARD

**ISO
16891**

First edition
2016-01-15

Test methods for evaluating degradation of characteristics of cleanable filter media

*Méthodes d'essais pour l'évaluation de la dégradation des propriétés
des medias filtrants décolmables*



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ISO 16891:2016(E)

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 meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 142, *Cleaning equipment for air and other gases*.

Introduction

The main purpose of using cleanable filter is, of course, to separate dust particles from dirty gases. They are usually designed to be usable for as long as two years to four years. However, it is very hard to design and/or select filter media properly, since their important characteristics of collection performance and residual pressure drop change with operation time. Physical and chemical properties of filter media, such as degradation in tensile strength, tenacity and so on, also change with time. Those changes can damage filter media and this can result in the breakage of bag filters and leakage of dust to the atmosphere. Hence the evaluation of these performances is also important for the rational design and the selection of appropriate filter media. ISO 11057:2011 has been published to meet the demand for the evaluation of filtration characteristics.

Changes in physical and chemical properties of filter media are caused by many factors, such as heat, corrosive gases, and mechanical reasons like clogging weave openings and increasing size of weave openings, the combination of those factors and so on (see [Annex A](#)). These changes are mostly adverse effects to filter media. Degradation proceeds very slowly, and thus, it takes a long time before recognizable and/or measurable change appears. Furthermore, the appearance of change depends on the combination of causes and fibre material. These facts are the main reason why mechanism of property changes has not been well understood despite its practical importance.^{[1]-[13]} Hence, the characterization or evaluation methods for filter media have not been established yet^{[14][15]} (see [Annex B](#)).

Nevertheless, there are demands for the establishment of a guideline for systematic characterization and evaluation of property change of filter media with respect to their relevant long-time operation not only from manufacturers of filter media, but also from producers and users of filter installations, especially the users treating combustion exhaust gases.

To evaluate degradation of filter media in a laboratory, it is important that experiment can be done in a relatively short time period by using controllable single or a small number of variables, i.e. causes of change.

Furthermore, it is important that the resulting effects are measureable. From this point of view, heat intensity is controllable by changing heating temperature and the intensity of corrosive gas is also controllable by changing gas concentration. Thus, their effect is expected to be accelerated. Of course, the effects can be evaluated by the degradation of tensile stress.

Evaluation of property change of filter media by corrosive gases can be done by contacting filter media with those corrosive materials in any phases, i.e. gas, liquid and solid state. Testing by dipping filter media into a solution of corrosive materials is easy and the resulting effects are expected to be obtained in a short period of time. Chinese Standard, GB/T 6719:2009 adopts this method.^[16] Solid state testing can be carried out by hard contact of filter media but it will take a long time and it is very hard to control the intensity of corrosiveness.

Testing under the gaseous state takes much longer than a liquid type test but the intensity of corrosiveness is controllable and it is much easier than the test under the solid state. Furthermore, test temperature and gas conditions except corrosive gas concentrations, are similar to the actual operation condition of filtration, which is suitable (see [Annex B](#)). Hence, in this International Standard, test methods for evaluating degradation characteristics of cleanable unwoven filter media with synthetic fibre by heat and corrosive gases are standardized because they are most widely used for bag filtration.

The major objective of this International Standard is to specify the testing method to assess the relative change of physical performances of new and used cleanable filter media for industrial application, by exposing it in hot and/or corrosive gas conditions ^{[17][18]}.

Test methods for evaluating degradation of characteristics of cleanable filter media

1 Scope

This International Standard specifies a standard reference test method useful to assess the relative degradation characteristics of cleanable filter media for industrial applications under standardized simulated test conditions. The main purpose of testing is to obtain the information about relative change of properties of filter media due to exposure to the simulated gas conditions for a long time. The main target of this International Standard is the property change of nonwoven fabric filters because they are frequently used under similar circumstances to the test gas conditions described in this International Standard.

The results obtained from this test method are not intended for predicting the absolute properties of full scale filter facilities. However, they are helpful for the design of a bag filter and selection and development of appropriate cleanable filter media, and for the identification of suitable operating parameters.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and 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 4606, *Textile glass — Woven fabrics — Determination of tensile breaking force and elongation at breaking by strip method*

ISO 13934-1, *Textiles — Tensile properties of fabrics — Part 1: Determination of maximum force and elongation at maximum force using the strip method*¹⁾

ISO 29464:2011, *Cleaning equipment for air and other gases — Terminology*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 29464:2011 and the following apply.

3.1

aged filter sheet

filter sheet exposed under simulated hot and corrosive gas conditions for a preset period of time to evaluate the change of filter properties

3.2

air permeability

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

3.3

average gas concentration

mean concentration of test gases during the exposure

1) This International Standard replaced ISO 5081, *Textiles — Woven fabrics — Determination of breaking strength and elongation (Strip method)*.

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