Test method for assessing the performance of gas-phase air cleaning media and devices for general ventilation - Part 1: Gas-phase air cleaning media (ISO 10121-1:2014)

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EUROPEAN STANDARD

NORME EUROPÉENNE

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EN ISO 10121-1

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English Version

Test method for assessing the performance of gas-phase air cleaning media and devices for general ventilation - Part 1: Gas-phase air cleaning media (ISO 10121-1:2014)

Méthodes d'essai pour l'évaluation de la performance des médias et des dispositifs de filtration moléculaire pour la ventilation générale - Partie 1: Médias de filtration moléculaire (GPACM) (ISO 10121-1:2014)

Methode zur Leistungsermittlung von Medien und Vorrichtungen zur Reinigung der Gasphase für die allgemeine Lüftung - Teil 1: Medien zur Reinigung der Gasphase (ISO 10121-1:2014)

This European Standard was approved by CEN on 6 March 2014.

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Foreword

This document (EN ISO 10121-1:2014) 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of an identical text or by endorsement, at the latest by October 2014, and conflicting national standards shall be withdrawn at the latest by October 2014.

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Introduction

There is an increasing use and need for gas-phase filtration in general filtration applications. This demand can be expected to increase rapidly due to the increasing pollution problems in the world together with an increasing awareness that solutions to the problems are available in the form of filtration devices or phrased more technically: gas-phase air cleaning devices (GPACD). The performance of devices using adsorption for gas removal relies to a large extent on the performance of a solid gas-phase air cleaning media (GPACM) incorporated in the device. Still applications, device performance and media performance are often poorly understood by the user and supplier of such media and devices. Media tests may also be adequate to offer data for real applications if actual low concentrations (<100 ppb) and longer exposure times (>weeks) can be used in the test, provided that the geometrical configuration, packing density and flow conditions of the small-scale test specimen are equal to those used in the real applications. Such tests are however not included in the scope of this part of ISO 10121. This part of ISO 10121 attempts to increase understanding and communication by supplying a more standardized interface between media suppliers, device suppliers and end users. At present, standards exist for general ventilation in Japan[1] by JIS, Automotive filters by ISO, in-duct sorptive media gas-phase air-cleaning devices by ASHRAE[2] and for adsorptive media by ASHRAE[3] and ASTM.[5] No international standard for general filtration exists today.

This part of ISO 10121 provides methods, test equipment, data interpretation and reporting for three different types of gas-phase air cleaning media (GPACM) intended for use in gas-phase air cleaning devices (GPACD) for general ventilation applications.

In addition information is given in a number of annexes:

— Annex A describes the normative validation procedure in detail in a tabulated form.

— Annex B gives a list of possible test gases, generation sources and suggests proper analysis equipment for common test gases

— Annex C describes the design of the test stand except the normative sample holder.

— Annex D describes the normative test setup and normative section of the test stand for the three different media configurations.

A general introduction to molecular filtration and molecular filtration testing can be found in the scientific literature.

The ISO 10121 series aims to provide laboratory test methods for media and devices which are used for removal of gas-phase contaminants from air in general ventilation. It consists of two parts:

— ISO 10121-1 covers three different media configurations and is targeted towards giving a standardized interface between media suppliers and producers of air cleaning devices. It may also be used between media suppliers and end customers with regards to loose fill media properties.

— ISO 10121-2 aims to give a standardized interface between suppliers of air cleaning devices and end customers seeking the best performing and most economical way to employ gas-phase filtration.

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Test method for assessing the performance of gas-phase air cleaning media and devices for general ventilation —

Part 1: Gas-phase air cleaning media

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1 Scope

This part of ISO 10121 aims to provide an objective laboratory test method, a suggested apparatus, normative test sections and normative tests for evaluation of three different solid gas-phase air cleaning media (GPACM) or GPACM configurations for use in gas-phase air cleaning devices intended for general filtration applications. This part of ISO 10121 is specifically intended for challenge testing and not for general material evaluation or pore system characterization. The three different types of GPACM identified in this part of ISO 10121 are GPACM-LF (particles of different shape and size intended for e.g. Loose Fill applications), GPACM-FL (FLat sheet fabric intended for e.g. flat one layer, pleated or bag type devices) and GPACM-TS (three dimensional structures that are many times thicker than flat sheet and e.g. used as finished elements in a device). The tests are conducted in an air stream and the GPACM configurations are challenged with test gases under steady-state conditions. Since elevated gas challenge concentrations (relative to general ventilation applications) are used, test data should be used to compare GPACM within the same configuration and not for the purpose of predicting performance in a real situation. It is also not implied that different GPACM configurations can be directly compared. The primary intention is to be able to compare like GPACM configurations to like, not between GPACM configurations. Testing of complete devices is described in ISO 10121-2.

To ensure objectivity for test equipment suppliers, no specific design of the test apparatus is defined: an example is illustrated in Annex C (informative). Instead normative demands for media sample holder design, apparatus properties and validation tests are specified.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 10121-2, *Test methods for assessing the performance of gas-phase air cleaning media and devices for general ventilation — Part 2: Gas-phase air cleaning devices (GPACD)*

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

ASTM D2854, *Standard Test Method for Apparent Density of Activated Carbon*

3 Terms and definitions

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

3.1
absorption
transport and dissolution of a sorbate into an absorbent

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