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Indoor air —

Part 44: Test method for measuring perceived indoor air quality for use in testing the performance of gas phase air cleaners

Air intérieur —

Partie 44: Méthode d'essai pour mesurer la qualité de l'air intérieur perçue à utiliser pour tester les performances des épurateurs d'air en phase gazeuse

Reference number
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Foreword

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This document was prepared by Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 6, *Indoor air*.

A list of all parts in the ISO 16000 series can be found on the ISO website.

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.

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Introduction

There is an increased interest in the development of air cleaners removing gaseous pollutants. Such air cleaners are also called air purifiers. They have been marketed for reducing concentrations of gaseous pollutants using different removal principles including among others physical and physicochemical sorption or oxidation (mineralization).

The performance of gas phase air cleaners can be evaluated by their removal efficiency defined by the ratio of concentration of pollutants downstream and upstream an air cleaner in the case of single pass efficiency. Removal efficiency can also be obtained by determining the change of concentration in a room where an air cleaner is in operation. Removal efficiency is consequently used to calculate clean air delivery rate i.e. the equivalent airflow delivered by an air cleaner that does not contain pollutants that were removed by an air cleaner (unpolluted air).

The removal efficiency is usually determined using a single pollutant or a mixture of up to a few pollutants thus not capturing the entire spectrum of pollutants present. For this purpose, sensory assessment of air quality made by human subjects can be made. The ratings of air quality as perceived by people are not normally used (seldom) to assess the removal efficiency of air cleaners although, based on them, ventilation requirements prescribed by standards in many parts of the world have been determined. Because measurements of chemical compounds will seldom capture all pollutants and because no models exist to describe how they will be perceived by building occupants, examining the effect of the air quality of an air cleaner as perceived by humans [so-called perceived air quality (PAQ)] seems relevant and should be considered as a supplementary method to chemical measurements.

There are different methods used to determine PAQ. The two most frequently used are the assessments of odour intensity of the air and acceptability of air quality; the latter can be used to determine the percentage of dissatisfied people. The measurements are made by human subjects (sensory panels) who use their olfactory sense to determine PAQ. Specially trained subjects (so-called trained panels) and untrained subjects (so-called untrained panels) can be used.

Historically, when ventilation requirements were determined in the 1930s by Yaglou and his colleagues, odour intensity was used to determine PAQ based on which ventilation requirements were prescribed. Yaglou's results were subsequently used in standards and handbooks in many parts of the world have been fundamentally based on his work. In the later research in the 1980s among others by Fanger and his colleagues, the ratings of acceptability were used to describe PAQ and ventilation requirements prescribed in the standards were subsequently revised.

Considering the above, there is a need for a standard to assess the performance of gas phase air cleaners based on sensory ratings of air quality so that it can be compatible with the current ventilation standards. This document describes a test method that can be used to evaluate the performance of air cleaners that primarily remove gaseous pollutants from the air based on the ratings of PAQ.

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Indoor air —

Part 44:
Test method for measuring perceived indoor air quality for use in testing the performance of gas phase air cleaners

1 Scope

This document specifies a laboratory test method for measuring perceived air quality using human subjects that can be used for assessing the performance of air cleaners removing gas-phase pollutants. The method describes the performance of gas-phase air cleaners with respect to removal of pollutants that can be sensed by human subjects.

The method has a reference to sensory tests specified in ISO 16000-28.

Air cleaners removing particles and aerosols (mechanical or electronic filters) can also remove pollutants responsible for sensory response. The method described in this document does not apply to testing of these air cleaners.

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 16000-3, *Indoor air — Part 3: Determination of formaldehyde and other carbonyl compounds in indoor and test chamber air — Active sampling method*

ISO 16000-6, *Indoor air — Part 6: Determination of organic compounds (VVOC, VOC, SVOC) in indoor and test chamber air by active sampling on sorbent tubes, thermal desorption and gas chromatography using MS or MS FID*

ISO 16000-9, *Indoor air — Part 9: Determination of the emission of volatile organic compounds from building products and furnishing — Emission test chamber method*

ISO 16000-11, *Indoor air — Part 11: Determination of the emission of volatile organic compounds from building products and furnishing — Sampling, storage of samples and preparation of test specimens*

ISO 16000-28, *Indoor air — Part 28: Determination of odour emissions from building products using test chambers*

ISO 16017-1, *Indoor, ambient and workplace air — Sampling and analysis of volatile organic compounds by sorbent tube/thermal desorption/capillary gas chromatography — Part 1: Pumped sampling*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

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