ICS 91.140.30 SLOVENSKÁ TECHNICKÁ NORMA Jún 2019

STN	**Skúšobná metóda na meranie účinnosti filtračných médií na sférický nanomateriál Časť 1: Častice veľkosti od 20 nm do 500 nm (ISO 21083-1: 2018)**	**STN EN ISO 21083-1** 12 5004

Test method to measure the efficiency of air filtration media against spherical nanomaterials - Part 1: Size range from 20 nm to 500 nm (ISO 21083-1:2018)

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 05/19

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EUROPEAN STANDARD

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English Version

Test method to measure the efficiency of air filtration media against spherical nanomaterials - Part 1: Size range from 20 nm to 500 nm (ISO 21083-1:2018)

Méthode d'essai pour mesurer l'efficacité des médias de filtration d'air par rapport aux nanomatériaux sphériques - Partie 1: Spectre granulométrique de 20 nm à 500 nm (ISO 21083-1:2018)

Prüfverfahren zur Messung der Effizienz von Luftfiltrationsmedien gegen sphärische Nanomaterialien - Teil 1: Partikelgrößenbereich von 20 nm bis 500 nm (ISO 21083-1:2018)

This European Standard was approved by CEN on 19 November 2018.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN ISO 21083-1:2018 E

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European foreword

This document (EN ISO 21083-1:2018) 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of an identical text or by endorsement, at the latest by June 2019, and conflicting national standards shall be withdrawn at the latest by June 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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Endorsement notice

The text of ISO 21083-1:2018 has been approved by CEN as EN ISO 21083-1:2018 without any modification.

INTERNATIONAL STANDARD

ISO 21083-1

First edition
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Test method to measure the efficiency of air filtration media against spherical nanomaterials —

Part 1: Size range from 20 nm to 500 nm

Méthode d'essai pour mesurer l'efficacité des médias de filtration d'air par rapport aux nanomatériaux sphériques —

Partie 1: Spectre granulométrique de 20 nm à 500 nm

Reference number
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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 the European Committee for Standardization (CEN) Technical Committee CEN/TC 195, *Air filters for general cleaning*, in collaboration with ISO Technical Committee TC 142, *Cleaning equipment for air and other gases*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

A list of all parts in the ISO 21083 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.

Introduction

Nano-objects are discrete piece of material with one, two or three external dimensions in the nanoscale (see ISO/TS 80004-2) and are building blocks of nanomaterials. Nanoparticles, referring to particles with at least one dimension below 100 nm, generally have a higher mobility than larger particles. Because of their higher mobility and larger specific surface area, available for surface chemical reactions, they can pose a more serious health risk than larger particles. Thus, particulate air pollution with large concentrations of nanoparticles can result in an increased adverse effect on human health and an increased mortality (see Reference [17]).

With the increased focus on nanomaterials and nanoparticles, the filtration of airborne nanoparticles is also subject to growing attention. Aerosol filtration can be used in diverse applications, such as air pollution control, emission reduction, respiratory protection for human and processing of hazardous materials. The filter efficiency can be determined by measuring the testing particle concentrations upstream and downstream of the filter. The particle concentration may be based on mass, surface area or number. Among these, the number concentration is the most sensitive parameter for nanoparticle measurement. State-of-the-art instruments enable accurate measurement of the particle number concentration in air and therefore precise fractional filtration efficiency. Understanding filtration efficiency for nanoparticles is crucial in schemes to remove nanoparticles, and thus, in a wider context, improve the general quality of the environment, including the working environment.

A large number of standards for testing air filters exist such as the ISO 29463 series and the ISO 16890 series. The test particle range in the ISO 29463 series is between 0,04 µm and 0,8 µm, and the focus is on measurement of the minimum efficiency at the most penetrating particle size (MPPS). The test particle range in the ISO 16890 series is between 0,3 µm and 10 µm. The ISO 21083 series aims to standardize the methods of determining the efficiencies of filter media, of all classes, used in most common air filtration products and it focuses on filtration efficiency of airborne nanoparticles, especially for particle size down to single-digit nanometres.

INTERNATIONAL STANDARD **ISO 21083-1:2018(E)**

Test method to measure the efficiency of air filtration media against spherical nanomaterials —

Part 1:
Size range from 20 nm to 500 nm

1 Scope

This document specifies the testing instruments and procedure for determining the fractional filtration efficiencies of flat sheet filter medium against airborne nanoparticles in the range of 20 nm to 500 nm. The testing methods in this document are limited to spherical or nearly-spherical particles to avoid uncertainties due to the particle shape.

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 5167 (all parts), *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full*

ISO 5725-2, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

ISO 15900, *Determination of particle size distribution — Differential electrical mobility analysis for aerosol particles*

ISO 27891, *Aerosol particle number concentration — Calibration of condensation particle counters*

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

ISO 29464, *Cleaning of air and other gases — Terminology*

