SLOVENSKI STANDARD
SIST EN ISO 29462:2022

01-oktober-2022

Nadomešča:
SIST EN ISO 29462:2013

Terensko preskušanje splošnih prezračevalnih filtrirnih naprav in sistemov na kraju samem (kraju vgradnje) glede učinkovitosti odstranjevanja delcev po njihovi velikosti in glede upornosti proti zračnemu toku (ISO 29462:2022)

Field testing of general ventilation filtration devices and systems for in situ removal efficiency by particle size and resistance to airflow (ISO 29462:2022)

Betriebserprobung von Filtereinrichtungen und -systemen für die allgemeine Lüftung hinsichtlich ihrer Abscheideeffizienz im eingebauten Zustand bezogen auf die Partikelgröße und den Druckverlust (ISO 29462:2022)

Essais in situ de filtres et systèmes de ventilation générale pour la mesure de l'efficacité en fonction de la taille des particules et de la résistance à l'écoulement de l'air (ISO 29462:2022)

Ta slovenski standard je istoveten z: **EN ISO 29462:2022**

ICS:

13.040.20	Kakovost okoljskega zraka	Ambient atmospheres
23.120	Zračniki. Vetrniki. Klimatske naprave	Ventilators. Fans. Air-conditioners
91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning systems

SIST EN ISO 29462:2022 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 29462

August 2022

ICS 91.140.30

Supersedes EN ISO 29462:2013

English Version

Field testing of general ventilation filtration devices and systems for in situ removal efficiency by particle size and resistance to airflow (ISO 29462:2022)

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This European Standard was approved by CEN on 22 July 2022.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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

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

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European foreword

This document (EN ISO 29462:2022) has been prepared by Technical Committee ISO/TC 142 "Cleaning equipment for air and other gases" in collaboration with Technical Committee CEN/TC 195 “Cleaning equipment for air and other gases” 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 February 2023, and conflicting national standards shall be withdrawn at the latest by February 2023.

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.

This document supersedes EN ISO 29462:2013.

Any feedback and questions on this document should be directed to the users’ national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

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Endorsement notice

The text of ISO 29462:2022 has been approved by CEN as EN ISO 29462:2022 without any modification.

INTERNATIONAL STANDARD

ISO 29462

Second edition
2022-07

Field testing of general ventilation filtration devices and systems for in situ removal efficiency by particle size and resistance to airflow

Essais in situ de filtres et systèmes de ventilation générale pour la mesure de l'efficacité en fonction de la taille des particules et de la résistance à l'écoulement de l'air

Reference number
ISO 29462:2022(E)

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Published in Switzerland

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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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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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

This second edition cancels and replaces the first edition (ISO 29462:2013), which has been technically revised.

The main changes are as follows:

— subclause 4.2 has been modified;

— some editorial corrections have been made.

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 purpose of this document is to provide a test procedure for evaluating the in situ performances of general ventilation filtration devices and systems. Although any filter with a filtration efficiency at or above 99 % or at or below 30 % when measured at 0,4 µm can theoretically be tested using this document, it can be difficult to achieve statically acceptable results for these type of filtration devices.

Supply air to the heating, ventilation and air-conditioning (HVAC) system contains viable and non-viable particles of a broad size range. Over time these particles cause problems for fans, heat exchangers and other system parts, decreasing their function and increasing energy consumption and maintenance. For health issues, the fine particles (< 2,5 µm) are the most detrimental.

Particles in the 0,3 µm to 5,0 µm size range are typically measured by particle counters that can determine the concentration of particles in specific size ranges. These instruments are commercially available and determine particle size along with the concentration level by several techniques (e.g. light scattering, electrical mobility separation, or aerodynamic drag). Devices based on light scattering are currently the most convenient and commonly used instruments for this type of measurement and are therefore the type of device used within this document.

Particles in the size range 1,0 µm to 5,0 µm are present in low numbers (less than 1 %, by count) in outdoor and supply air and have higher sampling-system losses. Results in the range > 1,0 µm therefore have lower accuracy and should be interpreted accordingly.

During in situ measurement conditions, the optical properties of the particles can differ from the optical properties of the particles used for calibrating the particle counter and testing it in the laboratory. Thus the particle counter can size the particles differently but count the overall number of particles correctly.

By adding an extra reference filter, the effect of varying measuring conditions can be reduced. Additionally, using this enhanced test method, the results can be used to correct the measured efficiencies in relation to the efficiency of the reference filter measured in laboratory using a standardized test aerosol.

The results from using the standard method or the enhanced method give both users and manufacturers a better knowledge of actual filter and installation properties.

It is important to note that field measurements generally result in larger uncertainties in the results compared to laboratory measurements. Field measurements can produce uncertainty from temporal and spatial variability in particle concentrations, from limitations on sampling locations due to air handling unit configurations, and from the use of field instrumentation. These factors can result in lower accuracy and precision in the calculated fractional efficiencies compared to laboratory measurements. This document is intended to provide a practical method in which the accuracy and precision of the result are maximized (and the precision of the result quantified) by recommending appropriate sampling locations, sample quantities, and instrumentation. This document is not intended to serve as a filter performance rating method. The results obtained from the test method described in this document do not replace those obtained through tests conducted in the laboratory.

Field testing of general ventilation filtration devices and systems for in situ removal efficiency by particle size and resistance to airflow

1 Scope

This document describes a procedure for measuring the performance of general ventilation air cleaning devices in their end use installed configuration. The performance measurements include removal efficiency by particle size and the resistance to airflow. The test procedures include the definition and reporting of the system airflow.

The procedure describes a method of counting ambient air particles of 0,3 µm to 5,0 µm upstream and downstream of the in-place air cleaner(s) in a functioning air handling system. The procedure describes the reduction of particle counter data to calculate removal efficiency by particle size.

Since filter installations vary dramatically in design and shape, a protocol for evaluating the suitability of a site for filter evaluation and for system evaluation is included. When the evaluated site conditions meet the minimum criteria established for system evaluation, the performance evaluation of the system can also be performed according to this procedure.

This document also describes performance specifications for the testing equipment and defines procedures for calculating and reporting the results. This document is not intended for measuring performance of portable or movable room air cleaners or for evaluation of filter installations with an expected filtration efficiency at or above 99 % or at or below 30 % when measured at 0,4 µm.

2 Normative references

There are no normative references in this document.

3 Terms, definitions, and abbreviated terms

3.1 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/

3.1.1
air filter bypass
proportion of the challenge air stream that passes around an air cleaner without interacting with the air cleaner (test device)

[SOURCE: ISO 29464:2017; 3.1.3, modified — The preferred terms "bypass" and "sneakage" have been deleted and "(test device)" has been added.]

3.1.2
air velocity
rate of air movement at the test device

Note 1 to entry: It is expressed in m/s (ft/min) to three significant figures.

[SOURCE: ISO 29464:2017, 3.1.2, modified — “at the test device” has been added to clarify the location, "fpm" has been changed to "ft/min".]

3.1.3
allowable measurable concentration of the particle counter
fifty percent of the maximum measurable concentration as stated by the manufacturer of the *particle counter* (3.1.12)

[SOURCE: ISO 29464:2017, 3.2.115]

3.1.4
coefficient of variation
C_V
standard deviation of a group of measurements divided by the mean

[SOURCE: ISO 29464:2017, 3.2.31]

3.1.5
coincidence error
error which occurs because at a given time more than one particle is contained in the measurement volume of a *particle counter* (3.1.12)

Note 1 to entry: The coincidence error leads to a measured number concentration which is too low and a value for the particle diameter which is too high.

[SOURCE: ISO 29464:2017, 3.2.32]

3.1.6
diluter
dilution system
system for reducing the sampled concentration to avoid *coincidence error* (3.1.5) in the *particle counter* (3.1.12)

[SOURCE: ISO 29464:2017, 3.2.46]

3.1.7
filter efficiency
fraction or percentage of a challenge contaminant that is removed by a test device

[SOURCE: ISO 29464:2017, 3.1.12, modified — The preferred term "efficiency" has been deleted.]

3.1.8
filter installation
filtration devices and systems such as a single filter or a group of filters mounted together with the same inlet and outlet of air

[SOURCE: ISO 29464:2017, 3.2.85]

3.1.9
general ventilation
process of moving air from outside the space, recirculated air, or a combination of these into or about a space or removing it from the space

[SOURCE: ISO 29464:2017, 3.2.100]

3.1.10
isoaxial sampling
sampling in which the flow in the sampler inlet is moving in the same direction as the flow being sampled

[SOURCE: ISO 29464:2017, 3.2.104]

3.1.11
isokinetic sampling
technique for air sampling such that the probe inlet *air velocity* (3.1.2) is the same as the velocity of the air surrounding the sampling point

[SOURCE: ISO 29464:2017, 3.2.105]

3.1.12
particle counter
device for detecting and counting numbers of discrete airborne particles present in a sample of air

[SOURCE: ISO 29464:2017, 3.2.114]

3.1.13
particle size range
defined *particle counter* (3.1.12) channel

[SOURCE: ISO 29464:2017, 3.2.137]

3.1.14
reference filter
dry media-type filter that has been laboratory tested for *removal efficiency by particle size* (3.1.15)

3.1.15
removal efficiency by particle size
removal efficiency
ratio of the number of particles retained by the filter to the number of particles measured upstream of the filter for a given particle-size range

[SOURCE: ISO 29464:2017, 3.2.149, modified — The preferred term "removal efficiency" has been added.]

3.1.16
resistance to airflow
difference in absolute (static) pressure between two points in a system

Note 1 to entry: Resistance to airflow is measured in Pa.

[SOURCE: ISO 29464:2017, 3.1.36, modified — The preferred terms "differential pressure", "pressure differential" and "pressure drop" have been deleted.]

3.1.17
system efficiency
removal efficiency (3.1.15) of a filter system where upstream and downstream particle count measurements may be across several filter banks or other system components

[SOURCE: ISO 29464:2017, 3.2.163]

3.1.18
HEPA filter
filters with performance complying with requirements of filter class ISO 35H to ISO 45H as per ISO 29463-1

[SOURCE: ISO 29464:2017, 3.2.84]

3.2 Abbreviated terms

AHU air handling unit

D/S downstream of test device