



BSI Standards Publication

Cleaning of air and other gases — Vocabulary

National foreword

This British Standard is the UK implementation of EN ISO 29464:2024. It is identical to ISO 29464:2024. It supersedes BS EN ISO 29464:2019, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee MCE/21, Filters for gases and liquids.

A list of organizations represented on this committee can be obtained on request to its committee manager.

BSI, as a member of CEN, is obliged to publish EN ISO 29464:2024 as a British Standard. However, attention is drawn to the fact that during the development of this European Standard, the UK committee voted against its approval.

The cleaning of supply or recirculation air requires the physical removal of the contaminant in the air as achieved by mechanical air filtration and molecular gas filtration. These are performance tested and classified by the BS EN ISO 16890 and BS EN ISO 10121 series of standards respectively. For stand-alone air cleaners, the UK committee advises users to consider BS EN 1822-1 and BS EN ISO 29463, Parts 2-5, with regards to HEPA filter testing. For UV light, performance testing is described in BS ISO 15714.

It is the view of the UK committee that any technology that irradiates or chemically treats contaminants (e.g. bioparticles such as viruses or bacteria) in the air but does not physically remove them from the air can be described as sterilizing or disinfecting the contaminants but not cleaning the air.

The UK committee encourages users to performance test any proposed technology in accordance with the current CEN/CENELEC and/or ISO/IEC standard that applies.

UK users might find BS EN 16798-3:2017, Table 6 – Definitions of air in and around buildings, a useful resource when using this standard.

Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

© The British Standards Institution 2024
Published by BSI Standards Limited 2024

ISBN 978 0 539 24378 9

ICS 01.040.91; 91.140.30

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 November 2024.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

English Version

Cleaning of air and other gases - Vocabulary (ISO 29464:2024)

Épuration de l'air et autres gaz - Vocabulaire (ISO 29464:2024)

Reinigung von Luft und anderen Gasen - Terminologie (ISO 29464:2024)

This European Standard was approved by CEN on 15 June 2024.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.



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

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

European foreword

This document (EN ISO 29464:2024) 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 January 2025, and conflicting national standards shall be withdrawn at the latest by January 2025.

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 29464:2019.

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.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Endorsement notice

The text of ISO 29464:2024 has been approved by CEN as EN ISO 29464:2024 without any modification.

Contents		Page
Foreword.....		iv
1	Scope.....	1
2	Normative references.....	1
3	Terms and definitions.....	1
3.1	Terms related to particle and gas-phase air cleaners.....	1
3.2	Terms related to particulate matter filters (including general ventilation, EPA, HEPA and ULPA filters).....	6
3.3	Terms related to air intake particle filters for rotary machines.....	20
3.4	Terms related to cleanable particle filter degradation.....	21
3.5	Terms related to gas phase air cleaners (GPAC).....	23
3.6	Terms related to UVC devices.....	30
3.7	Terms related to stand-alone electrically-powered air cleaners.....	33
Bibliography.....		35
Index.....		37

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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 third edition cancels and replaces the second edition (ISO 29464:2017), which has been technically revised.

The main changes are as follows:

- addition of [3.7](#) covering stand-alone electrically-powered air cleaners;
- addition of new terms and definitions in [3.5](#) and [3.6](#) due to the publication of new standards.

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.

Cleaning of air and other gases — Vocabulary

1 Scope

This document defines terms related to the air filtration industry.

This document is applicable to particulate matter and gas phase air filters and air cleaners used for the general ventilation of inhabited enclosed spaces. It is also applicable to air inlet filters for static or seaborne rotary machines, cleanable filters, UV-C germicidal devices, and stand-alone electrically-powered air cleaners.

It is not applicable to cabin filters for road vehicles or air inlet filters for mobile internal combustion engines for which separate arrangements exist. Dust separators for the purpose of air pollution control are also excluded.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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 Terms related to particle and gas-phase air cleaners

3.1.1

air cleaner

device for removing *contaminants* (3.1.12) from air in a ventilation system, building or other enclosed space

3.1.2

robotic air cleaner

air cleaner that operates and changes its physical location autonomously without user intervention

Note 1 to entry: The robotic air cleaner can consist of a part that houses the air cleaning function and can have a docking station and/or other accessories to assist its operation.

3.1.3

fresh-air air cleaner

air cleaner connected to the external environment, which provides pollutant-reduced outdoor air into an indoor space

Note 1 to entry: The fresh-air air cleaner can also include other auxiliary functions, such as heat exchange.

3.1.4

air velocity

rate of air movement

Note 1 to entry: It is expressed in m/s (fpm).

3.1.5

bypass

proportion of the *challenge air stream* (3.5.14) that passes around or through an *air cleaner* (3.1.1) without interacting with the air cleaner

3.1.6

calibrate

to compare readings from the instrument to be calibrated with those from a reference device

3.1.7

capture

removal of contaminants from an air stream

3.1.8

classification

allocation of air cleaners into groups and classes according to relevant aspects of their air cleaning performance

3.1.9

clean side

downstream side of an air cleaner element

3.1.10

combination product

air cleaner that includes a secondary function besides air cleaning within the same housing, such as humidifying, dehumidifying, heating, or air conditioning

3.1.11

concentration

quantity of one substance dispersed in a defined amount of another

3.1.12

contaminant

pollutant

substance (solid, liquid or gas) that negatively affects the intended use of a gas

3.1.13

contamination

pollution

presence of a substance that negatively affects the intended use of a gas

3.1.14

decontamination factor

ratio of the *contaminant* (3.1.12) concentration or particle number upstream of an air cleaner to the *contaminant concentration* (3.1.11) or particle number downstream of the air cleaner

Note 1 to entry: The decontamination factor can also be expressed as $1/(1 - \text{overall efficiency})$ or as $1/\text{penetration}$.

3.1.15

dirty side

upstream side of an air cleaner element

3.1.16

downstream

area or region into which air flows on leaving an air cleaner

3.1.17

removal efficiency

fraction or percentage of a challenge *contaminant* (3.1.12) that is removed by an air cleaner

3.1.18

average removal efficiency

value of removal efficiency which results from averaging the removal efficiencies determined over a number of discrete time intervals up to the end of an efficiency test

3.1.19

effluent

gas or liquid discharged from a given source into the external environment

Note 1 to entry: This is a general term describing any gas or liquid discharged from a given source; in this context, the discharged liquid or gas may contain associated gaseous, liquid and/or particulate *contaminants* (3.1.12).

3.1.20

face velocity

volumetric air flow rate divided by the *nominal air cleaner face area* (3.1.23)

Note 1 to entry: air cleaner face velocity is expressed in m/s (fpm).

3.1.21

filter

air filter

device for separating solid or liquid particles or gaseous *contaminant* (3.1.12) from an air stream passing through the device

Note 1 to entry: The device is generally formed of a layer or layers of porous, fibrous or granular material.

Note 2 to entry: Air being cleaned by a filter shall pass through the filter, whereas an *air cleaner* (3.1.1) can reduce air *contamination* (3.1.13) by any method.

3.1.22

filter face area

air cleaner face area

cross-sectional face area of the air cleaner through which air flows into the device

3.1.23

nominal filter face area

nominal air cleaner face area

cross-sectional face area of the air cleaner through which air flows into the device calculated using dimensions rounded up to the nearest integer

3.1.24

filter insert

replaceable part of a filter which contains the filter medium but which can only operate mounted inside a frame

3.1.25

filter medium

material used for separating contaminants from air and characterized by its porous structure

3.1.26

filter medium area

area of *filter medium* (3.1.25) contained in the filter

Note 1 to entry: For filters with pleats or folds, the filter medium area can be much larger than the *filter face area* (3.1.22).

3.1.27

effective filter medium area

area of the *filter medium* (3.1.25) contained in the filter through which air passes during operation

Note 1 to entry: This excludes areas covered by sealant, spacers, struts, etc.

Note 2 to entry: Effective filter medium area is expressed in m² (ft²).

3.1.28

medium velocity

volumetric air flow rate divided by the *effective filter medium area* (3.1.27) of the *filter* (3.1.21)

Note 1 to entry: Filter medium velocity is expressed in m/s (fpm).

Note 2 to entry: In devices where the filter medium surface area has been increased by use of pleats, folds or bags, the filter medium velocity may be much less than the filter *face velocity* (3.1.20).

3.1.29

flow rate

air flow rate

volume of air flowing through an air cleaner per unit time

3.1.30

design flow rate

design air flow rate

air flow rate specified by the manufacturer

3.1.31

user nominal air volume flow rate

volume air flow rate specified by the user, at which an air cleaner is used or tested in situ

Note 1 to entry: This flow rate may be different from the one specified by the manufacturer.

3.1.32

test flow rate

rate of air flow used for testing

Note 1 to entry: The flow rate is usually expressed in volumetric units [m³/h (cfm)].

Note 2 to entry: Test flow rate may differ from the manufacturer's specified flow through the air cleaner.

3.1.33

rated flow

flow rate through an air cleaner, either as stated by the manufacturer for defined conditions of use or as agreed between the interested parties for a particular installation

Note 1 to entry: The manufacturer's rated flow may differ from the *test air flow rate* (3.1.32).

3.1.34

gas

substance whose vapour pressure is greater than the *ambient pressure* (3.5.53) at ambient temperature

3.1.35

header frame

integral rigid frame of an air cleaner with a flange extending beyond the dimensions of the frame walls, enabling it to be fastened and sealed against the *holding frame* (3.1.36)

3.1.36

holding frame

rigid structural frame, part of an air handling system into which an air cleaner is fastened and sealed

3.1.37

housing

device used to hold an air cleaner

3.1.38

hood

inlet device for an air extraction system

3.1.39

integrity test

in situ test procedure for quantifying the unfiltered leakage of the system

3.1.40

leak

point in a filter at which the local penetration exceeds a given value

3.1.41

penetration

breakthrough

ratio of contaminant concentration downstream of an air cleaner to the upstream (challenge) *concentration* ([3.1.11](#))

Note 1 to entry: Sometimes expressed as a percentage.

Note 2 to entry: Penetration (P) is related to removal efficiency (E) by the expression: $E = (1 - P) \times 100 \%$.

Note 3 to entry: Penetration is related to the *decontamination factor* (DF) ([3.1.14](#)) by the expression: $DF = 1/\text{penetration}$.

3.1.42

reference device

primary device possessing accurately known parameters used as a standard for calibrating secondary devices

Note 1 to entry: Reference particle filters are laboratory tested for *removal efficiency by particle size* ([3.2.141](#)) and/or resistance to air flow.

3.1.43

resistance to air flow

differential pressure

pressure differential

pressure drop

difference in absolute (static) pressure between two points in an air flow system

Note 1 to entry: Resistance to air flow is expressed in Pa (inches of water).

3.1.44

test air

air being used for testing purposes

3.1.45

test device

device under test

DUT

air cleaner that is being subjected to performance testing

3.1.46

upstream

area or region from which air flows as it enters an air cleaner

3.1.47

washer

dust separator ([3.2.152](#)), *droplet separator* ([3.2.151](#)) or *gas purifier* ([3.5.41](#)) that depends on a liquid acting as a collecting medium for its operation

3.2 Terms related to particulate matter filters (including general ventilation, EPA, HEPA and ULPA filters)

3.2.1

aerosol

solid and/or liquid particles suspended in a gas

Note 1 to entry: Based on European Union and US Environmental Protection Agency information, atmospheric aerosol is divided into four size categories: the ultrafine range $x < 0,1 \mu\text{m}$, the fine range $0,1 \mu\text{m} \leq x \leq 2,5 \mu\text{m}$, the coarse range $2,5 \mu\text{m} < x \leq 10 \mu\text{m}$, and the large coarse range $x > 10 \mu\text{m}$, whereby x is the aerodynamic diameter of the particle.

3.2.2

liquid phase aerosol

liquid particles suspended in a gas

3.2.3

monodisperse aerosol

aerosol, the width of whose distribution function, described by the geometric standard deviation σ_g , is less than $1,15 \mu\text{m}$

3.2.4

aerosol neutralisation

action of bringing the aerosol to a Boltzmann charge equilibrium distribution with bipolar ions

Note 1 to entry: Neutralization should not be confused with discharging.

3.2.5

aerosol photometer

instrument that measures the intensity of light scattered by an aerosol sample

3.2.6

polydisperse aerosol

aerosol, the width of whose distribution function, described by the geometric standard deviation σ_g , exceeds $1,5 \mu\text{m}$

3.2.7

quasi-monodisperse aerosol

aerosol, the width of whose distribution function, described by the geometric standard deviation σ_g , is between $1,15 \mu\text{m}$ and $1,5 \mu\text{m}$

3.2.8

reference aerosol

defined approved aerosol for test measurement within a specific size range

3.2.9

solid phase aerosol

solid particles suspended in a gas

3.2.10

test aerosol

aerosol used for determining the particle removal efficiency performance of the device being tested or for calibrating particle measurement devices

3.2.11

agglomerate

collection of solid particles adhering to each other

3.2.12

agglomeration

action leading to the formation of *agglomerates* ([3.2.11](#))

3.2.13

agglutination

action of joining, by *impact* (3.2.85), solid particles coated with a thin adhesive layer or of trapping solid particles by impact on a surface coated with adhesive

3.2.14

aggregate

relatively stable assembly of dry particles, formed under the influence of physical forces

3.2.15

arrestance

gravimetric arrestance

measure of the ability of a filter to remove a standard test dust from the air passing through it under given operating conditions

Note 1 to entry: This measure is expressed as a mass percentage.

3.2.16

average arrestance

average gravimetric arrestance

ratio of the total mass of a standard test dust retained by the filter to the total mass of dust fed up to final test pressure differential

3.2.17

initial arrestance

initial gravimetric arrestance

ratio of the mass of a standard test dust retained by the filter to the mass of dust fed after the first increment of dust load

Note 1 to entry: This measure is expressed as a mass percentage.

Note 2 to entry: For example, in ISO 29461-1 or ISO 16890-3 procedure.

3.2.18

ash

solid residue of effectively complete combustion

3.2.19

fly ash

ash entrained by combustion gases

3.2.20

bioaerosol

particles of biological origin suspended in a gaseous medium

Note 1 to entry: Bioaerosol particles include viruses, bacteria, fungi, pollen, plant debris, fragments of these and their derivatives such as endotoxins, glucans, allergens and mycotoxins.

Note 2 to entry: The size of a bioaerosol particle can be larger if it is encased within a liquid drop, for example a virus in sputum

3.2.21

burst pressure

value of differential pressure across a filter, above which damage/destruction of the *filter medium* (3.1.25) or the structure occurs

3.2.22

calibration particle

mono-disperse spherical particle with a known mean particle size

EXAMPLE Polystyrene latex (PSL) particle traceable to an international standard of length where the standard uncertainty of the mean particle size is equal to or less than $\pm 2,5\%$.