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**Cleaning of air and other gases —  
Terminology**

*Épuration de l'air et autres gaz — Terminologie*

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# Sample Document

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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](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

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

For an explanation on 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 the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 142, *Cleaning equipment for air and other gases*.

This second edition of ISO 29464 cancels and replaces the first edition (ISO 29464:2011), which has been technically revised.

# Cleaning of air and other gases — Terminology

## 1 Scope

This document establishes a terminology for the air filtration industry and comprises terms and definitions only.

This document is applicable to particulate 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 and UV-C germicidal devices.

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

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

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

### 3.1 General, applicable to both particulate and gas-phase air cleaners

#### 3.1.1

##### **air cleaner**

device intended to remove *contaminants* (3.1.8) from air in a ventilation system or enclosed space

#### 3.1.2

##### **air velocity**

rate of air movement

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

#### 3.1.3

##### **bypass**

##### **air filter bypass**

##### **sneakage**

proportion of the *challenge air stream* (3.5.13) that passes around an *air cleaner* (3.1.1) without interacting with the air cleaner

#### 3.1.4

##### **calibrate**

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

**3.1.5**

**capture**

extraction of particles, liquid particles or gases, close to their sources for purposes of collection or sampling

**3.1.6**

**classification**

allocation of filters into groups and classes according to relevant aspects of their filtration performance

**3.1.7**

**concentration**

quantity of one substance dispersed in a defined amount of another

**3.1.8**

**contaminant**

**pollutant**

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

**3.1.9**

**contamination**

**pollution**

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

**3.1.10**

**decontamination factor**

ratio of the *contaminant* (3.1.8) concentration or particle number upstream of the test device to the *contaminant concentration* (3.1.7) or particle number downstream of the device

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

**3.1.11**

**downstream**

area or region into which fluid flows on leaving the test device

**3.1.12**

**efficiency**

**filter efficiency**

fraction or percentage of a challenge *contaminant* (3.1.8) that is removed by a test device

**3.1.13**

**average efficiency**

value of efficiency which results from averaging the efficiencies determined over a number of discrete intervals up to the final pressure differential

**3.1.14**

**effluent**

fluid discharged from a given source into the external environment

Note 1 to entry: This is a general term describing any fluid discharged from a given source; in this context, the discharged fluid may be liquid or gaseous and may contain associated liquid and/or particulate *contaminants* (3.1.8).

**3.1.15**

**face velocity**

**filter face velocity**

volumetric air flow rate divided by the *nominal filter face area* (3.1.18)

Note 1 to entry: filter face velocity is expressed in m/s.

**3.1.16****filter****air filter**

device for separating solid or liquid particles or gaseous *contaminant* (3.1.8) 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 must pass through the filter, whereas an *air cleaner* (3.1.1) can reduce air *contamination* (3.1.9) by any method.

**3.1.17****filter face area**

cross-sectional face area of the filter including the header frame when viewed from the direction of air flow using exact dimensions

**3.1.18****nominal filter face area**

cross-sectional face area of the filter including the header frame when viewed from the direction of air flow using nominal dimensions

**3.1.19****filter insert**

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

**3.1.20****filter medium**

material separating *particulate matter* (3.2.139) from gases and characterized by its separating structure and its structural and/or textile-technological characteristics

**3.1.21****filter medium area**

area of *filter medium* (3.1.20) contained in the filter

Note 1 to entry: For filters with pleats or folds, the filter medium area may be much larger than the *filter face area* (3.1.17).

**3.1.22****effective filter medium area****effective filtering area****exposed filter area**

area of the *filter medium* (3.1.20) 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 m<sup>2</sup>.

**3.1.23****filter medium velocity****media velocity****medium velocity**

volumetric air flow rate divided by the *effective filter medium area* (3.1.22) of the *filter element* (3.2.77)

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

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* (3.1.15).

**3.1.24**

**flow rate**

**air flow rate**

volume of air flowing through the filter per unit time

**3.1.25**

**nominal flow rate**

**nominal air flow rate**

air flow rate specified by the manufacturer

**3.1.26**

**air flow rate, test**

**test air flow rate**

**test flow**

**test flow rate**

**test volume flow rate**

air flow rate used for testing

Note 1 to entry: The flow rate is usually expressed in volumetric units (m<sup>3</sup>/s).

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

**3.1.27**

**rated flow**

flow rate through a test device, 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* ([3.1.26](#)).

**3.1.28**

**gas**

substance whose vapour pressure is greater than the *ambient pressure* ([3.5.50](#)) at ambient temperature

**3.1.29**

**header frame**

integral rigid frame of a filter enabling it to be fastened and sealed against the *holding frame* ([3.1.30](#))

**3.1.30**

**holding frame**

rigid structural frame, part of an air handling system into which filters are fastened and sealed

**3.1.31**

**housing**

device used to hold filter

**3.1.32**

**hood**

inlet device for extraction system

**3.1.33**

**leak**

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

**3.1.34**

**penetration**

**breakthrough**

ratio of contaminant concentration downstream of the test device to the upstream (challenge) *concentration* ([3.1.7](#))

Note 1 to entry: Sometimes expressed as a percentage.

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

Note 3 to entry: Penetration is related to the *decontamination factor* (DF) ([3.1.10](#)) by the expression:  $DF = 1/\text{penetration}$ .

### 3.1.35

#### **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* ([3.2.149](#)) and/or resistance to air flow.

### 3.1.36

#### **resistance to air flow**

#### **differential pressure**

#### **pressure differential**

#### **pressure drop**

difference in absolute (static) pressure between two points in a system

Note 1 to entry: Resistance to air flow is measured in Pa.

### 3.1.37

#### **test air**

air to be used for testing purposes

### 3.1.38

#### **test device**

*filter element* ([3.2.77](#)) being subjected to performance testing

### 3.1.39

#### **upstream**

area or region from which fluid flows as it enters the *test device* ([3.1.38](#))

### 3.1.40

#### **washer**

*dust separator* ([3.2.158](#)), *droplet separator* ([3.2.157](#)) or *gas purifier* ([3.5.38](#)) that depends on a liquid acting as a collecting medium for its operation

## 3.2 Particulate filters (including general ventilation, HEPA and ULPA filters)

### 3.2.1

#### **aerosol**

system of solid or liquid particles suspended in gas

Note 1 to entry: In general, one divides the atmospheric aerosol into three size categories: the ultrafine range  $x < 0,1 \mu\text{m}$ , the fine range  $0,1 \mu\text{m} \leq x < 1$  and the coarse range  $x \geq 1 \mu\text{m}$ , whereby  $x$  is the *particle diameter* ([3.2.124](#)).

### 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  $\sigma_g$ , is less than  $1,15 \mu\text{m}$

### 3.2.4

#### **aerosol photometer**

light-scattering airborne particle mass *concentration* ([3.1.7](#)) measuring apparatus, which uses a forward-scattering-light optical chamber to make measurements

**3.2.5**

**polydisperse aerosol**

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

**3.2.6**

**quasi-monodisperse aerosol**

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

**3.2.7**

**reference aerosol**

defined approved aerosol for test measurement within a specific size range

**3.2.8**

**solid phase aerosol**

solid particles suspended in a gas

**3.2.9**

**test aerosol**

aerosol used for determining performance of the device being tested and for calibrating particle measurement devices

**3.2.10**

**agglomerate**

collection of solid particles adhering to each other

**3.2.11**

**agglomeration**

action leading to the formation of *agglomerates* ([3.2.10](#))

**3.2.12**

**agglutination**

action of joining, by *impact* ([3.2.102](#)), solid particles coated with a thin adhesive layer or of trapping solid particles by impact on a surface coated with adhesive

**3.2.13**

**aggregate**

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

**3.2.14**

**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 weight percentage.

**3.2.15**

**average arrestance**

ratio of the total amount of loading dust retained by the filter to the total amount of dust fed up to final test pressure differential

**3.2.16**

**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****gravimetric arrestance**

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

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

**3.2.18****initial arrestance**

value of arrestance determined after the first loading cycle in a filter test

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

Note 2 to entry: This measure is expressed as a weight percentage.

**3.2.19****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 loading cycle in a filter test

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

**3.2.20****ash**

solid residue of effectively complete combustion

**3.2.21****fly ash**

ash entrained by combustion gases

**3.2.22****bioaerosol**

particles of biological origin with an aerodynamic diameter of up to 100 µm 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.

**3.2.23****burst pressure**

value of differential pressure across a filter, above which damage/destruction of the *filter medium* ([3.1.20](#)) or the structure occurs

**3.2.24****calibration particle**

mono-disperse spherical particle with a known mean particle size, e.g. 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  $\pm 2,5\%$

Note 1 to entry: The refractive index of (PSL) calibration particles is close to 1,59 at a wavelength of 589 nm (sodium D line).

**3.2.25****dust holding capacity****DHC**

total weight of loading dust captured by the air-cleaning device up to the final pressure differential

**3.2.26****test dust capacity****dust loading capacity****TDC**

amount of a standard test dust held by the test device at the final test pressure differential

**3.2.27**

**cleaning**

<after clogging> removal of the deposit of solid or liquid particles which has produced clogging

**3.2.28**

**clogging**

deposition, progressive or otherwise, of solid or liquid particles on or within a *filter medium* (3.1.20), causing the flow to be obstructed

**3.2.29**

**coagulation losses**

particle losses due to collision and adhesion of particles

Note 1 to entry: Coagulation affects the measured particle parameters as follows: the *particle number concentration* (3.2.131) decreases, the particle mass *concentration* (3.1.7) remains the same and the *particle size* (3.2.133) increases.

**3.2.30**

**coalescence**

action by which liquid particles in *suspension* (3.2.162) unite to form larger particles

**3.2.31**

**coefficient of variation**

**CV**

standard deviation of a group of measurements divided by the mean

**3.2.32**

**coincidence error**

error which occurs because at a given time more than one particle is contained in the measurement volume of a particle counter

Note 1 to entry: The coincidence error leads to a measured number *concentration* (3.1.7) which is too low and a value for the *particle diameter* (3.2.124) which is too high.

**3.2.33**

**correlation ratio**

calculation of any potential bias between the upstream and downstream sampling systems

**3.2.34**

**correlation ratio**

<sampling points>downstream particle concentration divided by the upstream particle concentration (measured without filter)

**3.2.35**

**counting efficiency**

expression of that proportion of the particles of detectable size suspended in the volume flow under analysis that make their way through the measured volume and are counted by the particle counter

EXAMPLE The ratio of the *concentration* (3.1.7) measured to actual aerosol concentration.

Note 1 to entry: The counting efficiency depends on the *particle size* (3.2.133) and decreases progressively in the proximity of the lower detection limit of the particle counter.

**3.2.36**

**counting rate**

number of counting events per unit time

**3.2.37**

**cyclone**

*dust separator* (3.2.158) or *droplet separator* (3.2.157) utilizing essentially the centrifugal force derived from the motion of the gas