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## Fire safety — Vocabulary

*Sécurité au feu — Vocabulaire*

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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 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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 92, *Fire safety*.

This fourth edition cancels and replaces the third edition (ISO 13943:2017), which has been technically revised.

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](http://www.iso.org/members.html).

## Introduction

Over the last two decades, there has been a significant growth in the field of fire safety. There has been a considerable development of fire safety engineering design, especially as it relates to construction projects, as well as the development of concepts related to performance-based design. With this continuing evolution, there is an increasing need for agreement on a common language in the broad and expanding area of fire safety, beyond what traditionally has been limited to the field of fire testing.

The first edition of this vocabulary, ISO 13943:2000, contained definitions of about 180 terms. However, the areas of technology that are related to fire safety have continued to evolve rapidly and this edition contains many new terms and their definitions, as well as revised definitions of some of the terms that were in earlier editions.

This document defines general terms to establish a vocabulary applicable to fire safety, including fire safety in buildings and civil engineering works and other elements within the built environment. It will be updated as terms and definitions for further concepts in the field of fire safety are agreed upon and developed.

It is important to note that it is possible that some fire safety terms may have a somewhat different interpretation than the one used in this document when used for regulation. In that case, the definition given in this document may not apply.

The terms in this document are:

- fundamental concepts;
- more specific concepts, such as those used specifically in fire testing or in fire safety engineering and may be used in ISO or IEC fire standards; and
- related concepts, as exemplified by terms used in building and civil engineering.

Annex A provides an index of deprecated terms.

The layout is designed according to ISO 10241-1, unless otherwise specified. The terms are presented in English alphabetical order and are in **bold type** except for deprecated terms, which are in normal type.

### Use of the term “item”

For the purposes of this document, in the English version, the term “item” (and in French “objet”) is used in a general meaning to represent any single object or assembly of objects, and may cover, for example, material, product, assembly, structure or building, as required in the context of any individual definition.

If the “item” under consideration is a test specimen, then the term “test specimen” is used.

The German version uses terminology such as material, product, kit, assembly and/or building to clarify the meaning of each definition.



# Fire safety — Vocabulary

## 1 Scope

This document defines terminology relating to fire safety as used in ISO and IEC fire standards.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

For the purposes 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 <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

### 3.1

#### **abnormal heat**

<electrotechnical> heat that is additional to that resulting from use under normal conditions, up to and including that which causes a *fire* (3.138)

### 3.2

#### **absorptivity**

ratio of the absorbed *radiant heat flux* (3.367) to the incident *radiative heat flux* (3.370)

Note 1 to entry: The absorptivity is dimensionless.

### 3.3

#### **acceptance criteria**

criteria that form the basis for assessing the acceptability of the safety of a design of a *built environment* (3.36)

Note 1 to entry: The criteria can be qualitative, quantitative or a combination of both.

### 3.4

#### **accuracy**

closeness of the agreement between the result of a measurement and the true value of the measurand

[SOURCE: ASTM E176]

### 3.5

#### **activation time**

time interval from response by a sensing device until the *suppression system* (3.431), *smoke* (3.401) control system, alarm system or other fire safety system is fully operational

### 3.6

#### **active fire protection**

method(s) used to reduce or prevent the spread and effects of *fire* (3.138), heat or *smoke* (3.401) by virtue of detection and/or suppression of the fire and which require a certain amount of motion and/or response to be activated

EXAMPLE The application of agents (e.g. halon gas or water spray) to the fire or the control of ventilation and/or smoke.

Note 1 to entry: Compare with the terms *passive fire protection* (3.335) and *suppression systems* (3.432).

### 3.7

#### **actual delivered density**

##### **ADD**

volumetric flow rate of water per unit area that is delivered onto the top horizontal surface of a simulated burning *combustible* (3.59) array

Note 1 to entry: ADD is typically determined relative to a specific *heat release rate* (3.235) of a *fire* (3.138).

Note 2 to entry: ADD can be measured according to ISO 6182-7.

Note 3 to entry: The typical unit is mm·min<sup>-1</sup>.

### 3.8

#### **acute effect**

sharp or severe effect, generally used in reference to human health effects

Note 1 to entry: Compare with the term *chronic effect* (3.57).

### 3.9

#### **acute toxicity**

*toxicity* (3.464) that causes rapidly occurring *toxic* (3.458) effects

Note 1 to entry: Compare with the term *toxic potency* (3.461).

### 3.10

#### **aerosol**

suspension of *droplets* (3.94) and/or solid particles in a gas phase which are generated by *fire* (3.138)

Note 1 to entry: The size of the droplets or particles typically range from under 10 nm to over 10 µm.

Note 2 to entry: Compare with the term **droplets**.

### 3.11

#### **aerosol particle**

individual piece of solid material that is part of the dispersed phase in an *aerosol* (3.10)

Note 1 to entry: There are two categories of fire aerosol particles: unburned or partially burned particles containing a high proportion of carbon (i.e. "soot"), and relatively completely combusted, small particle sized "ashes". *Soot* (3.409) particles of small diameter, (i.e. about 1 µm), typically consist of small elementary spheres of between 10 nm and 50 nm in diameter. Formation of soot particles is dependent on many parameters including nucleation, agglomeration and surface growth. *Oxidation* (3.331) of soot particles, i.e. further *combustion* (3.62), is also possible.

### 3.12

#### **afterflame**

*flame* (3.186) that persists after the *ignition source* (3.249) has been removed

### 3.13

#### **afterflame time**

length of time for which an *afterflame* (3.12) persists under specified conditions

Note 1 to entry: Compare with the term *duration of flaming* (3.95).



**3.14****afterglow**

persistence of *glowing combustion* (3.226) after both removal of the *ignition source* (3.249) and the cessation of any *flaming combustion* (3.202)

**3.15****afterglow time**

length of time for which an *afterglow* (3.14) persists under specified conditions

**3.16****agent-based model**

computational model for simulating the actions and interactions of autonomous agents using a set of rules

[SOURCE: ISO 20414]

**3.17****agent outlet**

orifice of a piping system by means of which an extinguishing fluid can be applied towards the source of a *fire* (3.138)

**3.18****alarm time**

time interval between *ignition* (3.247) of a *fire* (3.138) and activation of an alarm

Note 1 to entry: The time of ignition may be known, e.g. in the case of a *fire model* (3.160) or a *fire test* (3.181), or it may be assumed, e.g. it may be based upon an estimate working back from the time of detection. The basis on which the time of ignition is determined is always stated when the alarm time is specified.

**3.19**

**alight**, adj.

**lit**, adj. CA, US

**lighted**, adj. <https://standards.iteh.ai/catalog/standards/sist/ada54033-9106-49a4-8322-1b729de93255/iso-prf-13943>

**3.20****analyte**

substance that is identified or quantified in a specimen during an analysis

**3.21****arc resistance**

<electrotechnical> ability of an electrically insulating material to resist the influence of an electric arc, under specified conditions

Note 1 to entry: The arc resistance is identified by the length of the arc, the absence or presence of a conducting path, and the burning or damage of the *test specimen* (3.442).

**3.22****area burning rate**

DEPRECATED: burning rate

DEPRECATED: rate of burning

area of material *burned* (3.38) per unit time under specified conditions

Note 1 to entry: The typical unit is  $\text{m}^2 \cdot \text{s}^{-1}$ .

**3.23****arson**

crime of setting a *fire* (3.138), usually with intent to cause damage

**3.24**

**ash  
ashes**

mineral residue resulting from *complete combustion* (3.66)

**3.25**

**asphyxiant**

*toxicant* (3.463) that causes hypoxia, which can result in central nervous system depression or cardiovascular effects

Note 1 to entry: Loss of consciousness and ultimately, death may occur.

**3.26**

**atmospheric transmissivity**

ratio of the transmitted radiation intensity after passing through unit length of a participating medium (carbon dioxide, water vapour, dust and fog) to the radiation intensity that would have passed the same distance through clean air

[SOURCE: ISO 24678-7]

**3.27**

**auto-ignition**

**spontaneous ignition**

**self-ignition**

**unpiloted ignition**

DEPRECATED: spontaneous combustion *ignition* (3.247) caused by an internal exothermic reaction

Note 1 to entry: The ignition may be caused either by *self-heating* (3.394) or, in the case of **unpiloted ignition**, by heating from an external source, as long as the external source does not include an open flame.

Note 2 to entry: In North America, "**spontaneous ignition**" is the preferred term used to designate ignition caused by self-heating.

Note 3 to entry: Compare with the terms *piloted ignition* (3.341) and *spontaneous ignition temperature* (3.418).

**3.28**

**auto-ignition temperature**

minimum temperature at which *auto-ignition* (3.27) is obtained in a *fire test* (3.181)

Note 1 to entry: The typical unit is °C.

Note 2 to entry: Compare with the term *spontaneous ignition temperature* (3.418).

**3.29**

**available safe escape time**

**ASET**

**time available for escape**

calculated time interval between the time of *ignition* (3.247) and the time at which conditions become such that the occupant is estimated to be incapacitated, i.e. unable to take effective action to *escape* (3.114) to a *safe refuge* (3.385) or *place of safety* (3.342)

Note 1 to entry: The time of ignition may be known, e.g. in the case of a *fire model* (3.160) or a *fire test* (3.181), or it may be assumed, e.g. it may be based upon an estimate working back from the time of detection. The basis on which the time of ignition is determined needs to be stated.

Note 2 to entry: This definition equates *incapacitation* (3.255) with failure to escape. Other criteria for ASET are possible. If an alternate criterion is selected, it needs to be stated.

Note 3 to entry: Each occupant may have a different value of ASET, depending on that occupant's personal characteristics.

**3.30****backdraft**

rapid *flaming combustion* (3.202) caused by the sudden introduction of air into a confined oxygen-deficient space that contains hot products of incomplete *combustion* (3.62)

Note 1 to entry: In some cases, these conditions may result in an *explosion* (3.122).

**3.31****behavioural scenario**

description of the behaviour of occupants during the course of a *fire* (3.138)

**3.32****behavioural uncertainty**

uncertainty in evacuation scenarios associated with the impact of human behaviour in fire during evacuation

[SOURCE: ISO 20414]

**3.33****black body**

form that completely absorbs any electromagnetic radiation falling upon it

**3.34****black body radiation source**

ideal thermal radiation source which completely absorbs all incident heat radiation, whatever wavelength and direction

Note 1 to entry: The *emissivity* (3.103) of a black body radiant source is unity.

Note 2 to entry: A black body can also be an ideal radiator of energy.

[SOURCE: ISO 14934-1:2010, 3.1.7]

**3.35****building element**

integral part of a *built environment* (3.36)

Note 1 to entry: This includes floors, walls, beams, columns, doors, and penetrations, but does not include contents.

Note 2 to entry: This definition is wider in its scope than that given in ISO 6707-1.

**3.36****built environment**

building or other structure

EXAMPLE Off-shore platforms, civil engineering works such as tunnels, bridges and mines, and means of transportation such as motor vehicles and marine vessels.

Note 1 to entry: ISO 6707-1 contains a number of terms and definitions for concepts related to the built environment.

**3.37****buoyant plume**

convective updraft of fluid above a heat source

Note 1 to entry: Compare with the term *fire plume* (3.162).

**3.38****burn**, intransitive verb

undergo *combustion* (3.62)

3.39

**burn**, transitive verb  
cause *combustion* (3.62)

3.40

**burned area**

that part of the *damaged area* (3.79) of a material that has been destroyed by *combustion* (3.62) or *pyrolysis* (3.364), under specified conditions

Note 1 to entry: The typical unit is m<sup>2</sup>.

3.41

**burned length**

maximum extent in a specified direction of the *burned area* (3.40)

Note 1 to entry: The typical unit is m.

Note 2 to entry: Compare with the term *damaged length* (3.80).

3.42

**burning behaviour**

<fire tests> response of a *test specimen* (3.442), when it burns under specified conditions, to examination of *reaction to fire* (3.373) or *fire resistance* (3.165)

3.43

**burning debris**

burning material, other than drops, which has detached from a *test specimen* (3.442) during a *fire test* (3.181) and continues to *burn* (3.38) on the floor

Note 1 to entry: Compare with the terms *burning droplets* (3.44), *flaming debris* (3.203) and *flaming droplets* (3.204).

3.44

**burning droplets**

flaming molten or flaming liquefied drops which fall from a *test specimen* (3.442) during a *fire test* (3.181) and continue to *burn* (3.38) on the floor

Note 1 to entry: Compare with the terms *flaming droplets* (3.204), *flaming debris* (3.203) and *burning debris* (3.43).

3.45

**bursting**

violent rupture of an object due to an overpressure within it or upon it

3.46

**bushfire**

unplanned fire in a vegetated area

Note 1 to entry: This term is used primarily, but not exclusively, in Africa and Oceania.

[SOURCE: ISO/TR 24188]

3.47

**calibration**

<fire models> process of adjusting modelling parameters in a computational *fire model* (3.160) for the purpose of improving agreement with experimental data

3.48

**calibration related to fire modelling**

process of adjusting modelling parameters in a computational model for the purpose of improving agreement with experimental data

Note 1 to entry: ISO 20414 does not contain the delimiter "related to fire modelling".

[SOURCE: ISO 20414]

### 3.49

#### **calorimeter**

apparatus that measures heat

Note 1 to entry: Compare with the terms *heat release rate calorimeter* ([3.236](#)) and *mass calorimeter* ([3.293](#)).

### 3.50

#### **carboxyhaemoglobin**

compound formed when CO combines with **haemoglobin**

Note 1 to entry: **Haemoglobin** has an affinity for binding to CO that is approximately 245 times higher than that for binding to oxygen; thereby, the ability of haemoglobin to carry oxygen is seriously compromised during CO poisoning.

### 3.51

#### **carboxyhaemoglobin saturation**

percentage of blood haemoglobin converted to carboxyhaemoglobin from the reversible reaction with inhaled carbon monoxide

### 3.52

#### **ceiling jet**

gas motion in a hot gas layer near a ceiling that is generated by the buoyancy of a *fire plume* ([3.162](#)) that is impinging upon the ceiling

### 3.53

#### **char**, noun

carbonaceous residue resulting from *pyrolysis* ([3.364](#)) or incomplete *combustion* ([3.62](#))

### 3.54

#### **char**, verb

form *char* ([3.53](#))

### 3.55

#### **char length**

length of charred area

Note 1 to entry: Compare with the terms *burned length* ([3.41](#)) and *damaged length* ([3.80](#)).

Note 2 to entry: In some standards, char length is defined by a specific test method.

### 3.56

#### **chimney effect**

upward movement of hot *fire effluent* ([3.147](#)) caused by *convection* ([3.73](#)) currents confined within an essentially vertical *enclosure* ([3.106](#))

Note 1 to entry: This usually draws more air into the *fire* ([3.138](#)).

### 3.57

#### **chronic effect**

continuing over a long time period or recurring at low levels frequently, generally used in reference to human health effects

Note 1 to entry: Compare with the term *acute effect* ([3.8](#)).

### 3.58

#### **clinker**

solid agglomerate of residues formed by either *complete combustion* ([3.66](#)) or incomplete *combustion* ([3.62](#)) and which may result from complete or partial melting

**3.59**

**combustible**, adj.

capable of being *ignited* (3.246) and *burned* (3.38)

**3.60**

**combustible**, noun

item capable of *combustion* (3.62)

**3.61**

**combustible load**

theoretical mass that would be lost from a *test specimen* (3.442) when it is assumed to have undergone *complete combustion* (3.66) in a *fire test* (3.181)

**3.62**

**combustion**

exothermic reaction of a substance with an *oxidizing agent* (3.332)

Note 1 to entry: Combustion generally emits *fire effluent* (3.147) accompanied by *flames* (3.186) and/or *glowing* (3.225).

**3.63**

**combustion efficiency**

ratio of the amount of *heat release* (3.234) in *incomplete combustion* (3.62) to the theoretical heat of *complete combustion* (3.66)

Note 1 to entry: Combustion efficiency can be calculated only for cases where complete combustion can be defined.

Note 2 to entry: Combustion efficiency is usually expressed as a percentage.

Note 3 to entry: The combustion efficiency is dimensionless.

**3.64**

**combustion product**  
**product of combustion**

solid, liquid and gaseous material resulting from *combustion* (3.62)

Note 1 to entry: Combustion products may include *fire effluent* (3.147), *ash* (3.24), *char* (3.53), *clinker* (3.58) and/or *soot* (3.409).

**3.65**

**common mode failure**

failure involving a single source that affects more than one type of safety system simultaneously

**3.66**

**complete combustion**

*combustion* (3.62) in which all the *combustion products* (3.64) are fully oxidized

Note 1 to entry: This means that, when the *oxidizing agent* (3.332) is oxygen, all carbon is converted to carbon dioxide and all hydrogen is converted to water.

Note 2 to entry: If elements other than carbon, hydrogen and oxygen are present in the *combustible* (3.59) material, those elements are converted to the most stable products in their standard states at 298 K.

**3.67**

**composite material**

combination of two or more discrete materials

**3.68**

**computerized model**

operational computer programme that implements a *conceptual model* (3.71)

### 3.69 concentration

mass of a dispersed or dissolved material in a given volume

Note 1 to entry: For *fire effluent* (3.147), the typical unit is  $\text{g}\cdot\text{m}^{-3}$ .

Note 2 to entry: For *toxic gas* (3.459), concentration is usually expressed as a *volume fraction* (3.487) at  $T = 298 \text{ K}$  and  $P = 1 \text{ atm}$ , with typical units of  $\mu\text{L}/\text{L}$  ( $= \text{cm}^3/\text{m}^3 = 10^{-6}$ ).

Note 3 to entry: The concentration of a gas at a temperature,  $T$ , and a pressure,  $P$ , can be calculated from its volume fraction (assuming ideal gas behaviour) by multiplying the volume fraction by the density of the gas at that temperature and pressure.

Note 4 to entry: Pascal (Pa) is the SI unit for pressure; however, atmosphere (atm) is typically used in this context, where  $1 \text{ atm} = 101,3 \text{ kPa}$ .

### 3.70 concentration-time curve

<toxicology> plot of the *concentration* (3.69) of a *toxic gas* (3.459) or *fire effluent* (3.147) as a function of time

Note 1 to entry: For fire effluent, concentration is usually measured in units of  $\text{g}\cdot\text{m}^{-3}$ .

Note 2 to entry: For toxic gas, concentration is usually expressed as a *volume fraction* (3.487) at  $T = 298 \text{ K}$  and  $P = 1 \text{ atm}$ , with typical units of  $\mu\text{L}/\text{L}$  ( $= \text{cm}^3/\text{m}^3 = 10^{-6}$ ).

Note 3 to entry: Pascal (Pa) is the SI unit for pressure; however, atmosphere (atm) is typically used in this context, where  $1 \text{ atm} = 101,3 \text{ kPa}$ .

### 3.71 conceptual model

information, mathematical modelling, data, assumptions, boundary conditions and mathematical equations that describes the (physical) system or process of interest

### 3.72 controlled burn

operational strategy where the application of firefighting media such as water or foam is restricted or avoided

Note 1 to entry: Controlled burns are often conducted to minimize damage to public health and the environment. Other motivations for controlled burn may include limited danger of fire spread, concerns about fire fighter safety, or limited capacity and resources at hand for firefighting operations.

Note 2 to entry: The strategy would normally be used to try and prevent water pollution by contaminated firewater. It can also reduce air pollution due to the better *combustion* (3.62) and dispersion of pollutants, but it may also have adverse impacts, such as allowing or increasing the formation of hazardous and gaseous by-products. It may also have benefits for fire fighter safety and public health.

### 3.73 convection

transfer of heat by movement of a fluid

### 3.74 convective heat flux

*heat flux* (3.230) caused by *convection* (3.73)

### 3.75 convective heat transfer

transfer of heat to a surface from a surrounding fluid by *convection* (3.73)

Note 1 to entry: The amount of heat transfer depends on the temperature difference between the fluid and the surface, the fluid properties, and the fluid velocity and direction.