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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 13943 was prepared by Technical Committee ISO/TC 92, *Fire safety*, in cooperation with Technical Committee IEC/TC 89, *Fire hazard testing*.

This second edition cancels and replaces the first edition (ISO 13943:2000), which has been technically revised.

Introduction

Over the last two decades, there has been significant growth in the subject 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 large domain of fire safety, beyond what traditionally has been limited to the subject field of fire hazard testing.

The first edition of ISO 13943 contained definitions of about 180 terms. However, the area of technology that is related to fire safety has continued to evolve rapidly and this second edition contains many new terms as well as new definitions of some of the terms that were in the first edition.

This International Standard 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 subject field of fire safety are agreed upon and developed.

It is important to note that when used in legislation, some general fire safety terms have a narrower interpretation and hence the definition given in this International Standard does not apply.

The terms in this International Standard are

— fundamental concepts, which may be the starting point for other, more specific, definitions,

— more specific concepts, used in several areas of fire safety such as fire testing and fire safety engineering used in ISO and IEC fire standards, and

— related concept fields, designated by borrowed terms used in building and civil engineering.

The layout is in accordance with ISO 10241, unless otherwise specified. Thus, the elements of an entry appear in the following order:

a) entry number;

b) preferred term(s);

c) admitted term(s);

d) deprecated term(s);

e) definition;

f) example(s);

g) note(s).

The terms are presented in English alphabetical order and are in bold type except for accepted but non-preferred terms and deprecated terms, which are in normal type.

In a definition, example or note, reference to another entry in bold face is followed by the entry number in brackets, when it is first mentioned.

Entry number, preferred term and definition are the mandatory elements of each entry. Other elements appear only when appropriate.

Where a given term designates more than one concept, the concepts are listed in separate consecutive entries and the terms individually numbered.

If the term has a general meaning but is being used in a specific subject field, that subject field is indicated in angled brackets, 〈 〉, at the beginning of the definition.

Word class, e.g. “noun”, “adj.”, “verb”, is indicated if there is a risk of misunderstanding.

Where the term describes a physical quantity, a note is given to indicate the typical units that are used (except in cases where the unit is a single dimension such as mass, time or length).

Where a national variant in English is preferred or another equivalent exists, this has been given in bold face following the preferred term and annotated by the respective country code. Where no other country code or other equivalent is given in bold, this signifies that the preferred term is the accepted term in English-speaking countries.

A term following the preferred term not given in boldface type is a non-preferred synonym.

To facilitate the location of any term given in this International Standard, irrespective of preference or country of origin, the alphabetical index lists all preferred and non-preferred synonyms, without the respective country code being indicated. There is also a systematic index and an index of deprecated terms.

Fire safety — Vocabulary

1 Scope

This International Standard defines terminology relating to fire safety as used in International Standards and other documents of the International Standardization Organization and the International Electrotechnical Committee.

2 Normative references

The following referenced documents are indispensable for the application 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 6707-1:2004, *Building and civil engineering — Vocabulary — Part 1: General terms*

ISO 10241:1992, *International terminology standards — Preparation and layout*

3 Definition of the term "item"

For the purposes of this International Standard, the English term "item" 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.

4 Terms and definitions

4.1
abnormal heat
⟨electrotechnical⟩ heat that is additional to that resulting from use under normal conditions, up to and including that which causes a **fire** (4.96)

4.2
acceptance criteria
criteria that form the basis for assessing the acceptability of the safety of a design of a **built environment** (4.26)

NOTE The criteria can be qualitative, quantitative or a combination of both.

4.3
activation time
time interval from response by a sensing device until the **suppression system** (4.314), smoke control system, alarm system or other fire safety system is fully operational

4.4
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** (4.43) array

NOTE 1 It is typically determined relative to a specific **heat release rate** (4.177) of a **fire** (4.98).

NOTE 2 ADD can be measured as described in ISO 6182-7.

NOTE 3 The typical units are millimetres per minute ($mm \cdot min^{-1}$).

4.5
acute toxicity
toxicity (4.341) that causes rapidly occurring **toxic** (4.335) effects

cf. **toxic potency** (4.338)

4.6
afterflame
flame (4.133) that persists after the **ignition source** (4.189) has been removed

4.7
afterflame time
length of time for which an **afterflame** (4.6) persists under specified conditions

cf. **duration of flaming** (4.71)

4.8
afterglow
persistence of **glowing combustion** (4.169) after both removal of the **ignition source** (4.189) and the cessation of any **flaming combustion** (4.148)

4.9
afterglow time
length of time during which an **afterglow** (4.8) persists under specified conditions

4.10
agent outlet
orifice of a piping system by means of which an extinguishing fluid can be applied towards the source of a **fire** (4.98)

4.11
alarm time
time interval between **ignition** (4.187) of a **fire** (4.98) and activation of an alarm

NOTE The time of **ignition** can be known, e.g. in the case of a **fire model** (4.116) or a **fire test** (4.132), 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.

4.12
alight, adj.
lit, adj. CA, US
lighted, adj.
undergoing **combustion** (4.46)

4.13
arc resistance
⟨electrotechnical⟩ ability of an electrically insulating material to resist the influence of an electric arc, under specified conditions

NOTE 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** (4.321).

4.14
area burning rate
burning rate (deprecated)
rate of burning (deprecated)
area of material **burned** (4.28) per unit time under specified conditions

NOTE The typical units are square metres per second ($m^2 \cdot s^{-1}$).

4.15
arson
crime of setting a **fire** (4.98), usually with intent to cause damage

4.16
ash
ashes
mineral residue resulting from **complete combustion** (4.50)

4.17
asphyxiant
toxicant (4.340) that causes hypoxia, which can result in central nervous system depression or cardiovascular effects

NOTE Loss of consciousness and ultimately death can occur.

4.18
auto-ignition
spontaneous ignition
self-ignition CA, US
unpiloted ignition CA, US
spontaneous combustion (deprecated)
ignition (4.187) resulting from a rise of temperature without a separate **ignition source** (4.189)

NOTE 1 The **ignition** can be caused either by **self-heating** (4.287, 4.288) or by heating from an external source.

NOTE 2 In North America, “spontaneous ignition” is the preferred term used to designate ignition caused by self-heating.

4.19
auto-ignition temperature
spontaneous ignition temperature
minimum temperature at which **auto-ignition** (4.18) is obtained in a **fire test** (4.132)

NOTE The typical units are degrees Celsius (°C).

4.20
available safe escape time
ASET
time available for escape
for an individual occupant, the calculated time interval between the time of **ignition** (4.187) 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** (4.82) to a **safe refuge** (4.280) or **place of safety** (4.253)

NOTE 1 The time of **ignition** can be known, e.g. in the case of a **fire model** (4.116) or a **fire test** (4.132), 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.

NOTE 2 This definition equates **incapacitation** (4.194) with failure to escape. Other criteria for ASET are possible. If an alternate criterion is selected, it is necessary that it be stated.

NOTE 3 Each occupant can have a different value of ASET, depending on that occupant's personal characteristics.

4.21
backdraft
rapid **flaming combustion** (4.148) caused by the sudden introduction of air into a confined oxygen-deficient space that contains hot products of incomplete **combustion** (4.46)

NOTE In some cases, these conditions can result in an **explosion** (4.87).

4.22
behavioural scenario
description of the behaviour of occupants during the course of a **fire** (4.98)

4.23
black body
form that completely absorbs any electromagnetic radiation falling upon it

4.24
black-body radiant source
radiant source that produces electromagnetic radiation as described by Planck's distribution function

NOTE The **emissivity** (4.75) of a black body radiant source is unity.

4.25
building element
integral part of a **built environment** (4.26)

NOTE 1 This includes floors, walls, beams, columns, doors, and penetrations, but does not include contents.

NOTE 2 This definition is wider in its scope than that given in ISO 6707-1.

4.26
built environment
building or other structure

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

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

4.27
buoyant plume
convective updraft of fluid above a heat source

cf. **fire plume** (4.118)

4.28
burn, intransitive verb
undergo **combustion** (4.46)

4.29
burn, transitive verb
cause **combustion** (4.46)

4.30
burned area
that part of the **damaged area** (4.59) of a material that has been destroyed by **combustion** (4.46) or **pyrolysis** (4.266), under specified conditions

NOTE The typical units are square metres (m^2).

4.31
burned length
maximum extent in a specified direction of the **burned area** (4.30)

NOTE The typical units are metres (m).

cf. **damaged length** (4.60)

4.32
burning behaviour
⟨fire tests⟩ response of a **test specimen** (4.321), when it burns under specified conditions, to examination of **reaction to fire** (4.272) or **fire resistance** (4.121)

4.33
bursting
violent rupture of an object due to an overpressure within it or upon it

4.34
calibration
⟨fire modelling⟩ process of adjusting modelling parameters in a computational model for the purpose of improving agreement with experimental data

4.35
calorimeter
apparatus that measures heat

cf. **heat release rate calorimeter** (4.178) and **mass calorimeter** (4.219).

4.36
carboxyhaemoglobin saturation
percentage of blood haemoglobin converted to carboxyhaemoglobin from the reversible reaction with inhaled carbon monoxide

4.37
ceiling jet
gas motion in a hot gas layer near a ceiling that is generated by the buoyancy of a **fire plume** (4.118) that is impinging upon the ceiling

4.38
char, noun
carbonaceous residue resulting from **pyrolysis** (4.266) or incomplete **combustion** (4.46)

4.39
char, verb
form **char** (4.38)

4.40
char length
length of charred area

cf. **burned length** (4.31) and **damaged length** (4.60)

NOTE In some standards, char length is defined by a specific test method.

4.41
chimney effect
upward movement of hot **fire effluent** (4.105) caused by **convection** (4.54) currents confined within an essentially vertical **enclosure** (4.77)

NOTE This usually draws more air into the **fire** (4.96).

4.42
clinker
solid agglomerate of residues formed by either **complete combustion** (4.50) or incomplete **combustion** (4.46) and which can result from complete or partial melting

4.43
combustible, adj.
capable of being **ignited** (4.186) and burned

4.44
combustible, noun
item capable of **combustion** (4.46)

4.45
combustible load
theoretical mass that would be lost from a **test specimen** (4.321) if it were to undergo **complete combustion** (4.50) in a **fire test** (4.132)

4.46
combustion
exothermic reaction of a substance with an **oxidizing agent** (4.246)

NOTE Combustion generally emits **fire effluent** (4.105) accompanied by **flames** (4.133) and/or **glowing** (4.168).

4.47
combustion efficiency
ratio of the amount of **heat release** (4.176) in incomplete **combustion** (4.46) to the theoretical heat of **complete combustion** (4.50)

NOTE 1 Combustion efficiency can be calculated only for cases where **complete combustion** can be defined.

NOTE 2 Combustion efficiency is dimensionless and is usually expressed as a percentage.

4.48
combustion product
product of combustion
solid, liquid and gaseous material resulting from **combustion** (4.46)

NOTE Combustion products can include **fire effluent** (4.105), **ash** (4.16), **char** (4.38), **clinker** (4.42) and/or **soot** (4.298).

4.49
common mode failure
failure involving a single source that affects more than one type of safety system simultaneously

4.50
complete combustion
combustion (4.46) in which all the **combustion products** (4.48) are fully oxidized

NOTE 1 This means that, when the **oxidizing agent** (4.246) is oxygen, all carbon is converted to carbon dioxide and all hydrogen is converted to water.

NOTE 2 If elements other than carbon, hydrogen and oxygen are present in the **combustible** (4.43) material, those elements are converted to the most stable products in their standard states at 298 K.

4.51
composite material
structured combination of two or more discrete materials

4.52
concentration
mass per unit volume

NOTE 1 For a **fire effluent** (4.105) the typical units are grams per cubic metre ($g \cdot m^{-3}$).

NOTE 2 For a **toxic gas** (4.336), concentration is usually expressed as a **volume fraction** (4.351) at $T = 298$ K and $P = 1$ atm, with typical units of microlitres per litre (µL/L), which is equivalent to cm^3/m^3 or 10^{-6}.

NOTE 3 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.

4.53
concentration-time curve
⟨toxicology⟩ plot of the **concentration** (4.52) of a **toxic gas** (4.336) or **fire effluent** (4.105) as a function of time

NOTE 1 For fire effluent, concentration is usually measured in units of grams per cubic metre ($g \cdot m^{-3}$).

NOTE 2 For a toxic gas, concentration is usually expressed as a **volume fraction** (4.351) at $T = 298$ K and $P = 1$ atm, with typical units of microlitres per litre (µL/L), which is equivalent to cm^3/m^3 or 10^{-6}.

4.54
convection
transfer of heat by movement of a fluid

4.55
convective heat flux
heat flux (4.173) caused by **convection** (4.54)

4.56
corrosion damage
physical and/or chemical damage or impaired function caused by chemical action

4.57
corrosion target
sensor used to determine the degree of **corrosion damage** (4.56), under specified conditions

NOTE The sensor may be a product or a component. It may also be a reference material or object used to simulate the behaviour of a product or a component.

4.58
critical fire load
fire load (4.114) required in a **fire compartment** (4.102) to produce a **fire** (4.98) of sufficient severity to cause failure of a **fire barrier(s)** (4.99) or structural member(s) located within or bounding the fire compartment

4.59
damaged area
total of those surface areas that have been affected permanently by **fire** (4.97) under specified conditions

cf. **burned area** (4.30)

NOTE 1 Users of this term should specify the types of damage to be considered. This can include, for example, loss of material, deformation, softening, **melting behaviour** (4.228), **char** (4.38) formation, **combustion** (4.46), **pyrolysis** (4.266) or chemical attack.

NOTE 2 The typical units are square metres (m^2).

4.60
damaged length
maximum extent in a specified direction of the **damaged area** (4.59)

cf. **char length** (4.40) and **burned length** (4.31)

4.61
defend in place
life safety strategy in which occupants are encouraged to remain in their current location rather than to attempt **escape** (4.82) during a **fire** (4.98)

4.62
deflagration
combustion (4.46) wave propagating at subsonic velocity

NOTE If within a gaseous medium, deflagration is the same as a **flame** (4.133).

4.63
design density
measured volumetric flow rate of water from sprinklers, per unit area, that is delivered in the absence of a **fire** (4.98)

NOTE The typical units are millimetres per minute ($mm \cdot min^{-1}$).

4.64
design fire
quantitative description of assumed **fire** (4.98) characteristics within the **design fire scenario** (4.65)

NOTE It is, typically, an idealized description of the variation with time of important **fire** (4.98) variables, such as **heat release rate** (4.177), **flame spread rate** (4.143), **smoke production rate** (4.295), **toxic gas** (4.336) **yields** (4.354), and temperature.

4.65
design fire scenario
specific **fire scenario** (4.129) on which a deterministic **fire-safety engineering** (4.126) analysis is conducted

4.66
detection time
time interval between **ignition** (4.187) of a **fire** (4.98) and its detection by an automatic or manual system

4.67
deterministic model
fire model (4.116) that uses science-based mathematical expressions to produce the same result each time the method is used with the same set of input data values

4.68
detonation
reaction characterized by a shock wave propagating at a velocity greater than the local speed of sound in the unreacted material

4.69
diffusion flame
flame (4.133) in which **combustion** (4.46) occurs in a zone where the **fuel** (4.161) and the **oxidizing agent** (4.246) mix, having been initially separate

cf. **pre-mixed flame** (4.259)

4.70
draught-free environment
space in which the results of experiments are not significantly affected by the local air speed

NOTE A qualitative example is a space in which a wax candle **flame** (4.133) remains essentially undisturbed. Quantitative examples are **small-scale fire tests** (4.292) in which a maximum air speed of 0,1 $m \cdot s^{-1}$ or 0,2 $m \cdot s^{-1}$ is sometimes specified.

4.71
duration of flaming
length of time for which **flaming combustion** (4.148) persists under specified conditions

cf. **afterflame time** (4.7)

4.72
effective concentration 50
EC_{50}
concentration (4.52) of a **toxic gas** (4.336) or **fire effluent** (4.105), statistically calculated from concentration-response data, that causes a specified effect in 50 % of a population of a given species within a specified **exposure time** (4.90) and **post-exposure time** (4.254)

cf. **IC_{50}** (4.181)

NOTE 1 For fire effluent, typical units are grams per cubic metre ($g \cdot m^{-3}$).

NOTE 2 For a toxic gas, typical units are microlitres per litre (µL/L) (at $T = 298$ K and $P = 1$ atm); see **volume fraction** (4.351).

NOTE 3 The observed effect is usually a behavioural response, **incapacitation** (4.194), or death. The EC_{50} for incapacitation is termed the IC_{50} (4.181). The EC_{50} for lethality is termed the LC_{50} (4.207).

4.73
effective exposure dose 50
ECt_{50}
product of **EC_{50}** (4.72) and the **exposure time** (4.90) over which it is determined

cf. **exposure dose** (4.89)

NOTE 1 For **fire effluent** (4.105), typical units are grams times minutes per cubic metre ($g \cdot min \cdot m^{-3}$).

NOTE 2 For a **toxic gas** (4.336), typical units are microlitres times minutes per litre ($\mu L \cdot min \cdot L^{-1}$) (at $T = 298$ K and $P = 1$ atm); see **volume fraction** (4.351).

NOTE 3 ECt_{50} is a measure of **toxic potency** (4.338).

4.74
effective heat of combustion
heat released (4.176) from a burning **test specimen** (4.321) in a given time interval divided by the mass lost from the test specimen in the same time period

NOTE 1 It is the same as the **net heat of combustion** (4.237) if all the test specimen is converted to volatile **combustion** (4.46) products and if all the **combustion products** (4.48) are fully oxidized.

NOTE 2 The typical units are kilojoules per gram ($kJ \cdot g^{-1}$).

4.75
emissivity
ratio of the radiation emitted by a radiant source to the radiation that would be emitted by a **black body radiant source** (4.24) at the same temperature

NOTE Emissivity is dimensionless.

4.76
empirical formula
chemical formula of a substance in which the relative numbers of atoms of each type are given

NOTE Typically, the number for one type of atom (usually C or O) is chosen to be an integer; e.g., a particular sample can be represented as $C_6H_{8,9}O_{4,1}N_{0,3}Cl_{0,01}$.

4.77
enclosure
⟨built environment⟩ volume defined by bounding surfaces, which may have one or more openings

4.78
enclosure
⟨electrotechnical⟩ external casing protecting the electrical and mechanical parts of apparatus

NOTE The term excludes cables.

4.79
end-use condition
intended condition to which an item is subjected during its normal working life, when used in accordance with the manufacturer's instructions

4.80
environment
conditions and surroundings that can influence the behaviour of an item or persons when exposed to **fire** (4.98)

4.81
equivalence ratio
fuel (4.161)/air ratio divided by the fuel/air ratio required for a **stoichiometric mixture** (4.309)

cf. **fuel-lean combustion** (4.162), **fuel-rich combustion** (4.163), **stoichiometric combustion** (4.308), and **stoichiometric mixture** (4.309)

NOTE 1 Standard, dry air contains 20,95 % oxygen by volume. In practice, the oxygen **concentration** (4.52) in entrained air can vary and a calculation of the equivalence ratio to a standard, dry air basis is required.

NOTE 2 The equivalence ratio is dimensionless.

4.82
escape
effective action taken to reach a **safe refuge** (4.280) or **place of safety** (4.253)

4.83
evacuation behaviour
behaviour which enables occupants of a building to reach a **place of safety** (4.253)

cf. **movement behaviour** (4.233) and **pre-movement behaviour** (4.260)

4.84
evacuation time
time interval between the time of a warning of **fire** (4.98) being transmitted to the occupants and the time at which the occupants of a specified part of a building or all of the building are able to enter a **place of safety** (4.253)

cf. **available safe escape time** (4.20)

4.85
event tree
depiction of temporal, causal sequences of events, built around a single initiating condition

4.86
exit
designated point of departure from a building

4.87
explosion
⟨chemical⟩ abrupt expansion of gas that can result from a rapid **oxidation** (4.245) or decomposition reaction, with or without an increase in temperature

4.88
exposed surface
surface of a **test specimen** (4.321) subjected to the heating conditions of a **fire test** (4.132)

4.89
exposure dose
measure of the maximum amount of a **toxic gas** (4.336) or **fire effluent** (4.105) that is available for inhalation, calculated by integration of the area under a **concentration-time curve** (4.53)

NOTE 1 For fire effluent, typical units are grams times minutes per cubic metre ($g \cdot min \cdot m^{-3}$).

NOTE 2 For a toxic gas, typical units are microlitres times minutes per litre ($\mu L \cdot min \cdot L^{-1}$) (at $T = 298$ K and $P = 1$ atm); see **volume fraction** (4.351).

4.90
exposure time
length of time for which people, animals or **test specimens** (4.321) are exposed under specified conditions

4.91
extent of combustion
⟨electrotechnical⟩ maximum length of a **test specimen** (4.321) that has been destroyed by **combustion** (4.46) or **pyrolysis** (4.266), under specified test conditions, excluding any region damaged only by deformation

4.92
extinction area of smoke
product of the volume occupied by **smoke** (4.293) and the **extinction coefficient** (4.93) of the smoke

NOTE It is a measure of the amount of smoke, and the typical units are square metres (m^2).

4.93
extinction coefficient
natural logarithm of the ratio of incident light intensity to transmitted light intensity, per unit light path length

NOTE Typical units are reciprocal metres (m^{-1}).

4.94
F factor
minimum **concentration** (4.52) of a **toxic gas** (4.336) **irritant** (4.203, 4.204) that is expected to seriously compromise the ability to **escape** (4.82) from a **fire** (4.98)

cf. **fractional effective concentration** (4.159)

NOTE The concentration is usually expressed as a **volume fraction** (4.351) at $T = 298$ K and $P = 1$ atm, in which case the typical units are microlitres per litre (μL/L), which is equivalent to cm^3/m^3 or 10^{-6}.

4.95
fault tree
depiction of the logical dependencies of events on one another, built around a critical resulting event, which usually has an unacceptable level of consequence and may be described as a failure

4.96
fire
〈general〉 process of **combustion** (4.46) characterized by the emission of heat and **fire effluent** (4.105) and usually accompanied by **smoke** (4.293), **flame** (4.133), **glowing** (4.168) or a combination thereof

NOTE In the English language the term “fire” is used to designate three concepts, two of which, **fire** (4.97) and **fire** (4.98), relate to specific types of self-supporting combustion with different meanings and two of them are designated using two different terms in both French and German.

4.97
fire
〈controlled〉 self-supporting **combustion** (4.46) that has been deliberately arranged to provide useful effects and is limited in its extent in time and space

4.98
fire
〈uncontrolled〉 self-supporting **combustion** (4.46) that has not been deliberately arranged to provide useful effects and is not limited in its extent in time and space

4.99
fire barrier
fire separation, noun CA
separating element (4.291) that exhibits **fire integrity** (4.113) or **fire stability** (4.131) or **thermal insulation** (4.328), or a combination thereof, for a period of time under specified conditions

4.100
fire behaviour
change in, or maintenance of, the physical and/or chemical properties of an item and/or structure exposed to **fire** (4.96)

cf. **fire performance** (4.117)

NOTE 1 This concept covers both **reaction to fire** (4.272) and **fire resistance** (4.121).

NOTE 2 In English, this term may also be used to describe the behaviour of a **fire** (4.96).

4.101
fire classification
standardized system of classifying **fires** (4.96) in terms of the nature of the **fuel** (4.161)

EXAMPLE In Europe and Australasia there are six classes:

— Class A: fire involving solid materials, usually of an organic nature, in which **combustion** (4.46) normally takes place with the formation of **glowing** (4.168) embers;

— Class B: fires involving liquids or liquefiable solids;

— Class C: fires involving gases;

— Class D: fires involving metals;

— Class E: fires involving electrical hazards;

— Class F: fires involving cooking oil or fat.

4.102
fire compartment
enclosed space, which may be subdivided, separated from adjoining spaces by **fire barriers** (4.99)

4.103
fire danger
concept including both **fire hazard** (4.112) and **fire risk** (4.124)

4.104
fire decay
stage of fire development after a **fire** (4.96) has reached its maximum intensity and during which the **heat release rate** (4.177) and the temperature of the fire are decreasing

4.105
fire effluent
totality of gases and aerosols, including suspended particles, created by **combustion** (4.46) or **pyrolysis** (4.266) in a **fire** (4.96)

4.106
fire-effluent decay characteristic
physical and/or chemical change in **fire effluent** (4.105) caused by ageing and transport

4.107
fire-effluent transport
movement of **fire effluent** (4.105) from the location of a **fire** (4.96)

4.108
fire exposure
extent to which persons, animals or items are subjected to the conditions created by **fire** (4.96)

4.109
fire extinguishment
process that eliminates **combustion** (4.46)

4.110
fire gases
gaseous part of **combustion product(s)** (4.48)

cf. **fire effluent** (4.105)

NOTE In French, the term “gaz de combustion” also applies to engine exhaust gas and can then include particles.

4.111
fire growth
stage of **fire** (4.96) development during which the **heat release rate** (4.177) and the temperature of the fire are increasing

4.112
fire hazard
physical object or condition with a potential for an undesirable consequence from **fire** (4.98)

4.113
fire integrity
integrity CA, US
ability of a **separating element** (4.291), when exposed to **fire** (4.97) on one side, to prevent the passage of **flame(s)** (4.133) and hot gases or the occurrence of flames on the unexposed side for a stated period of time in a standard **fire resistance** (4.121) test

cf. **integrity criterion “E”** (4.199)

4.114
fire load
quantity of heat which can be released by the **complete combustion** (4.50) of all the **combustible** (4.43) materials in a volume, including the facings of all bounding surfaces

NOTE 1 Fire load may be based on **effective heat of combustion** (4.74), **gross heat of combustion** (4.170), or **net heat of combustion** (4.237) as required by the specifier.

NOTE 2 The word “load” can be used to denote force or power or energy. In this context, it is being used to denote energy.

NOTE 3 The typical units are kilojoules (kJ) or megajoules (MJ).

4.115
fire load density
fire load (4.114) per unit area

NOTE The typical units are kilojoules per square metre ($kJ \cdot m^{-2}$).

4.116
fire model
fire simulation
calculation method that describes a system or process related to **fire** (4.96) development, including fire dynamics and the effects of fire

cf. **deterministic model** (4.67), **numerical fire model** (4.241), **physical fire model** (4.251) and **probabilistic model** (4.264)

4.117
fire performance
response of a **test specimen** (4.321) when exposed to a **fire test** (4.132)

cf. **fire behaviour** (4.100)

4.118
fire plume
plume
buoyant gas stream and any materials transported within it, above a **fire** (4.96)

cf. **buoyant plume** (4.27)

4.119
fire point
minimum temperature at which a material **ignites** (4.184) and continues to **burn** (4.28) for a specified time after a standardized small **flame** (4.133) has been applied to its surface under specified conditions

cf. **flash point** (4.154)

NOTE 1 In some countries, the term “fire point” has an additional meaning: a location where fire-fighting equipment is sited, which may also comprise a fire-alarm call point and fire instruction notices.

NOTE 2 The typical units are degrees Celsius (°C).

4.120
fire propagation
combination of **flame spread** (4.142) and spread of **fire effluent** (4.105)

4.121
fire resistance
ability of a **test specimen** (4.321) to withstand **fire** (4.97) or give protection from it for a period of time

NOTE 1 Typical criteria used to assess fire resistance in a standard **fire test** (4.132) are **fire integrity** (4.113), **fire stability** (4.131), and **thermal insulation** material (4.327).

NOTE 2 “Fire-resistant” (adj.) refers only to this ability.

4.122
fire retardance (deprecated)

cf. **flame retardance** (4.138), **fire retardant** (4.123) and **flame retardant** (4.139)

4.123
fire retardant, noun
substance added, or a treatment applied, to a material in order to delay **ignition** (4.187) or to reduce the rate of **combustion** (4.46)

cf. **flame retardant** (4.139)

NOTE The use of (a) fire retardant(s) does not necessarily suppress **fire** (4.96) or terminate combustion.

4.124
fire risk
probability of a **fire** (4.98) combined with a quantified measure of its consequence

NOTE It is often calculated as the product of probability and consequence.

4.125
fire-risk curve
graphical representation of **fire risk** (4.124)

NOTE It is normally a log/log plot of cumulative probability versus cumulative consequence.

4.126
fire-safety engineering
application of engineering methods based on scientific principles to the development or assessment of designs in the **built environment** (4.26) through the analysis of specific **fire scenarios** (4.129) or through the quantification of risk for a group of fire scenarios

4.127
fire-safety management
application and service life maintenance of procedures to achieve **fire-safety objectives** (4.128)

NOTE Procedures include **fire** (4.98) protection measures, evacuation plans and the training of occupants to use such measures and plans.

4.128
fire-safety objective
desired outcome with respect to the probability of an unwanted **fire** (4.98), relative to essential aspects of the **built environment** (4.26)

NOTE The essential aspects typically relate to the issues of life safety, conservation of property, continuity of operations, protection of the **environment** (4.80) and preservation of heritage.

4.129
fire scenario
qualitative description of the course of a **fire** (4.98) with respect to time, identifying key events that characterise the studied fire and differentiate it from other possible fires

NOTE It typically defines the **ignition** (4.187) and **fire growth** (4.111) processes, the **fully developed fire** (4.164) stage, the **fire decay** (4.104) stage, and the **environment** (4.80) and systems that impact on the course of the fire.

4.130
fire severity
capacity of a **fire** (4.98) to cause damage

NOTE Methods of quantifying fire severity are usually based on the temperature of the fire as a function of time.

4.131
fire stability
〈fire resistance〉 ability of a **building element** (4.25) to resist collapse for a stated period of time in a standard **fire resistance** (4.121) test

NOTE The building element might or might not be load-bearing.

4.132
fire test
test that measures behaviour of a **fire** (4.96) or exposes an item to the effects of a **fire** (4.97)

NOTE The results of a fire test can be used to quantify **fire severity** (4.130) or determine the **fire resistance** (4.121) or **reaction to fire** (4.272) of the **test specimen** (4.321).

4.133
flame, noun
rapid, self-sustaining, sub-sonic propagation of **combustion** (4.46) in a gaseous medium, usually with emission of light

4.134
flame, verb
produce **flame** (4.133)

4.135
flame application time
period of time for which a burner **flame** (4.133) is applied to a **test specimen** (4.321)

4.136
flame front
boundary of **flaming combustion** (4.148) at the surface of a material or propagating through a gaseous mixture

4.137
flame resistance (deprecated)

cf. **fire resistance** (4.121) and **flame retardance** (4.138)

4.138
flame retardance
property of a material whereby **flaming combustion** (4.148) is slowed, terminated or prevented

NOTE 1 Flame retardance can be an inherent property of the basic material or it may be imparted by specific treatment.

NOTE 2 The degree of flame retardance exhibited by a material during testing can vary with the test conditions.

4.139
flame retardant, noun
substance added, or a treatment applied, to a material in order to suppress or delay the appearance of a **flame** (4.133) and/or reduce the **flame-spread rate** (4.143)

cf. **fire retardant** (4.123)

NOTE The use of (a) flame retardant(s) does not necessarily suppress **fire** (4.96) or terminate **combustion** (4.46).

4.140
flame retardant treatment
process whereby improved **flame retardance** (4.138) is imparted to a material or product

4.141
flame retarded
treated with a **flame retardant** (4.139)

4.142
flame spread
propagation of a **flame front** (4.136)

4.143
flame-spread rate
burning rate (deprecated)
rate of burning (deprecated)
distance travelled by a **flame front** (4.136) during its propagation, divided by the time of travel, under specified conditions

NOTE The typical units are metres per second ($m \cdot s^{-1}$).

4.144
flame-spread time
time taken by a **flame front** (4.136) on a burning material to travel a specified distance on the surface, or to cover a specified surface area under specified conditions

4.145
flameproof
⟨electrotechnical⟩ class of methods used to prevent the **ignition** (4.187), caused by electrical equipment, of explosive atmospheres

cf. **flameproof enclosure** (4.146)

NOTE The term is deprecated in other applications.

4.146
flameproof enclosure
⟨electrotechnical⟩ **enclosure** (4.78) that can withstand the pressure developed during an **explosion** (4.87) of the atmosphere within the enclosure and can prevent the transmission of the explosion to the atmosphere surrounding the enclosure

4.147
flaming, noun
continuation of the presence of a **flame** (4.133) after its first appearance

4.148
flaming combustion
combustion (4.46) in the gaseous phase, usually with emission of light

4.149
flaming debris
material separating from a burning item and continuing to **flame** (4.134) during a **fire** (4.96) or **fire test** (4.132)

4.150
flaming droplet
molten material separating from a burning item and continuing to **flame** (4.134) during a **fire** (4.96) or **fire test** (4.132)

4.151
flammability
ability of a material or product to **burn** (4.28) with a **flame** (4.133) under specified conditions

4.152
flammability limit
concentration (4.52) of **fuel** (4.161) vapour in air either above which or below which propagation of a **flame** (4.133) does not occur in the presence of an **ignition source** (4.189)

cf. **lower flammability limit** (4.216), **upper flammability limit** (4.349)

NOTE The concentration is usually expressed as a **volume fraction** (4.351) at a defined temperature and pressure and expressed as a percentage.

4.153
flammable
capable of **flaming combustion** (4.148) under specified conditions

4.154
flash point
minimum temperature to which it is necessary to heat a material or a product for the vapours emitted to **ignite** (4.184) momentarily in the presence of **flame** (4.133) under specified conditions

NOTE The typical units are degrees Celsius (°C).

4.155
flashing
existence of **flame** (4.133) repeated for short periods of time on or over the surface of a **test specimen** (4.321)

NOTE The short periods of time are typically of less than 1 s duration.

4.156
flashover
⟨stage of fire⟩ transition to a state of total surface involvement in a **fire** (4.98) of **combustible** (4.43) materials within an **enclosure** (4.77)

4.157
flashover
⟨electrotechnical⟩ electrical discharge that occurs over the surface of a solid dielectric in a gaseous or liquid medium

4.158
Fourier transform infra-red spectroscopy
FTIR
analytical chemical technique, based on **spectroscopy** (4.304), in which a gaseous sample is subjected to excitation of molecular bonds by pulsed, broad-band infra-red radiation, and the Fourier transform mathematical method is used to obtain an absorption spectrum

NOTE FTIR can be used for the simultaneous measurement of the **concentration(s)** (4.52) of component gases in a gas mixture and is, thus, a useful method for the analysis of gaseous **fire effluent** (4.105).

4.159
fractional effective concentration
FEC
ratio of the **concentration** (4.52) of an **irritant** (4.203, 4.204) to that concentration expected to produce a specified effect on an exposed subject of average susceptibility

cf. **F factor** (4.94)

NOTE 1 As a concept, FEC may refer to any effect, including **incapacitation** (4.194), lethality or other endpoints.

NOTE 2 When not used with reference to a specific irritant, the term “FEC” represents the summation of FEC values for all irritants in a fire-generated atmosphere.

NOTE 3 The fractional effective concentration is dimensionless.

4.160
fractional effective dose
FED
ratio of the **exposure dose** (4.89) for an **asphyxiant** (4.17) to that exposure dose of the asphyxiant expected to produce a specified effect on an exposed subject of average susceptibility

NOTE 1 As a concept, fractional effective dose may refer to any effect, including **incapacitation** (4.194), lethality or other endpoints.

NOTE 2 When not used with reference to a specific asphyxiant, the term "FED" represents the summation of FED values for all asphyxiants in a **combustion** (4.46) atmosphere.

NOTE 3 The FED is dimensionless.

4.161
fuel
substance that can react exothermically with an **oxidizing agent** (4.246)

4.162
fuel-lean combustion
combustion (4.46) in which the **equivalence ratio** (4.81) is less than unity

NOTE In well-ventilated **fires** (4.96), the **fuel** (4.161)/air mixture is fuel-lean and **complete combustion** (4.50) tends to occur.

4.163
fuel-rich combustion
combustion (4.46) in which the **equivalence ratio** (4.81) is greater than unity

NOTE In ventilation-controlled **fire(s)** (4.96), the **fuel** (4.161)/air mixture is fuel-rich, and relatively high **concentration(s)** (4.52) of **pyrolysis** (4.266) products and incomplete combustion gases result.

4.164
fully developed fire
state of total involvement of **combustible** (4.43) materials in a **fire** (4.98)

4.165
gasify
transform a solid and/or liquid material into a gaseous state

4.166
global equivalence ratio
⟨fire compartment tests⟩ mass lost from the **combustible(s)** (4.44) divided by the mass of air introduced into the **fire compartment** (4.102) and divided by the stoichiometric **fuel** (4.161)/air mass ratio

cf. **equivalence ratio** (4.81)

NOTE 1 It can be determined continuously or as a test average, depending on the instrumentation in place.

NOTE 2 For gaseous fuels, an alternative expression of the global equivalence ratio can be based on the fuel/air volume ratio.

NOTE 3 The global equivalence ratio is dimensionless.

4.167
global equivalence ratio
⟨bench-scale fire tests⟩ mass lost from the **test specimen** (4.321) divided by the mass of air in the system (closed systems) or introduced into the system (open systems) and divided by the stoichiometric **fuel** (4.161)/air mass ratio

cf. **equivalence ratio** (4.81)

NOTE 1 It can be determined continuously or as a test average, depending on the instrumentation in place.

NOTE 2 For gaseous fuels, an alternative expression of the global equivalence ratio can be based on the fuel/air volume ratio.

NOTE 3 The global equivalence ratio is dimensionless.

4.168
glowing, noun
luminosity caused by heat

cf. **incandescence** (4.193)

4.169
glowing combustion
combustion (4.46) of a material in the solid phase without **flame** (4.133) but with emission of light from the combustion zone

cf. **incandescence** (4.193)

4.170
gross heat of combustion
heat of combustion (4.174) of a substance when the **combustion** (4.46) is complete and any produced water is entirely condensed under specified conditions

cf. **complete combustion** (4.50)

NOTE The typical units are kilojoules per gram ($kJ \cdot g^{-1}$).

4.171
heat capacity
amount of thermal energy required to raise the temperature of an object by one kelvin

cf. **specific heat capacity** (4.302)

NOTE The typical units are joules per kelvin ($J \cdot K^{-1}$).

4.172
heat flow rate
amount of thermal energy transferred per unit time

NOTE The typical units are watts (W).

4.173
heat flux
amount of thermal energy emitted, transmitted or received per unit area and per unit time

NOTE The typical units are watts per square metre ($W \cdot m^{-2}$).

4.174
heat of combustion
calorific potential (deprecated)
calorific value (deprecated)
thermal energy produced by **combustion** (4.46) of unit mass of a given substance

cf. **effective heat of combustion** (4.74), **gross heat of combustion** (4.170) and **net heat of combustion** (4.237)

NOTE The typical units are kilojoules per gram ($kJ \cdot g^{-1}$).

4.175
heat of gasification
thermal energy required to change a unit mass of material from the condensed phase to the vapour phase at a given temperature

NOTE The typical units are kilojoules per gram ($kJ \cdot g^{-1}$).

4.176
heat release
thermal energy produced by **combustion** (4.46)

NOTE The typical units are joules (J).

4.177
heat release rate
burning rate (deprecated)
rate of burning (deprecated)
rate of thermal energy production generated by **combustion** (4.46)

NOTE The typical units are watts (W).

4.178
heat release rate calorimeter
apparatus that measures **heat release rate** (4.177) by measuring species concentrations, temperature and the flow rate of **fire effluent** (4.105) drawn through a test duct

cf. **calorimeter** (4.35) and **mass calorimeter** (4.219)

4.179
heat stress
conditions caused by exposure to elevated or reduced temperature, **radiant heat flux** (4.269), or a combination of these factors

NOTE These conditions can apply to people, or to products. In the case of a product, the heat stress can occur within the product during its normal use, or it can be caused by external influence.

4.180
hyperventilation
rate and/or depth of breathing which is greater than normal

4.181
IC_{50}
concentration (4.52) of a **toxic gas** (4.336) or **fire effluent** (4.105), statistically calculated from concentration-response data, that causes **incapacitation** (4.194) of 50 % of a population of a given species within a specified **exposure time** (4.90) and **post-exposure time** (4.254)

cf. **effective concentration 50** (4.72)

NOTE 1 For fire effluent, typical units are grams per cubic metre ($g \cdot m^{-3}$).

NOTE 2 For a toxic gas, the typical units are microlitres per litre (µL/L) at $T = 298$ K and $P = 1$ atm: see **volume fraction** (4.351).

4.182
ignitability
ease of ignition
measure of the ease with which a **test specimen** (4.321) can be **ignited** (4.186), under specified conditions

cf. **ignition time** (4.190)

4.183
ignitable
capable of being **ignited** (4.186)

4.184
ignite, intransitive verb
catch **fire** (4.96) with or without the application of an external heat source

4.185
ignite, transitive verb
initiate **combustion** (4.46)

cf. **light** (4.210)

4.186
ignited
caused to be in a state of undergoing **combustion** (4.46)

4.187
ignition
sustained ignition (deprecated)
⟨general⟩ initiation of **combustion** (4.46)

4.188
ignition
sustained ignition (deprecated)
⟨flaming combustion⟩ initiation of **sustained flame** (4.319)

4.189
ignition source
source of energy that initiates **combustion** (4.46)

4.190
ignition time
duration of exposure of a **test specimen** (4.321) to a defined **ignition source** (4.189) required for the initiation of **sustained combustion** (4.318) under specified conditions

cf. **ease of ignition** (4.182), **ignitability** (4.182) and **exposure time** (4.90)

4.191
impaired escape capability
effects on willingness and efficiency of **escape** (4.82) actions, which may delay, slow or prevent evacuation

4.192
imposed load
superimposed load CA, US
force applied to an item other than that associated with its own mass

cf. **load-bearing criterion "R"** (4.215)

NOTE The typical units are newtons (N).

4.193
incandescence
emission of light produced by a material when intensely heated

cf. **glowing** (4.168)

NOTE Incandescence can be produced by materials in liquid or solid states, with or without **combustion** (4.46).

4.194
incapacitation
state of physical inability to accomplish a specific task

NOTE An example of a specific task is to accomplish **escape** (4.82) from a **fire** (4.98).

4.195
individual risk
measure of **fire risk** (4.124) limited to consequences experienced by an individual and based on the individual's pattern of life

4.196
inflammability (deprecated)

cf. **flammability** (4.151)

4.197
inflammable (deprecated)

cf. **flammable** (4.153)

4.198
insulation criterion "I"
"I" criterion
criterion by which **thermal insulation** (4.328) is assessed

NOTE 1 It is based on the measurement of temperature rise on the surface away from **fire** (4.97).

NOTE 2 The insulation criterion can vary and depends on the **fire-safety objective(s)** (4.128).

4.199
integrity criterion "E"
"E" criterion
criterion by which the ability of a **separating element** (4.291) to prevent the passage of **flames** (4.133) and hot gases is assessed

cf. **fire integrity** (4.113) and **fire resistance** (4.121)

4.200
intermediate-scale fire test
fire test (4.132) performed on a **test specimen** (4.321) of medium dimensions

NOTE A fire test performed on a test specimen for which the maximum dimension is between 1 m and 3 m is usually called an intermediate-scale fire test.

4.201
intrinsically safe circuit
⟨electrotechnical⟩ circuit in which any **spark** (4.300) or thermal effect is incapable of causing **ignition** (4.187) of a mixture of **flammable** (4.153) or **combustible** (4.43) material in air under specified test conditions

NOTE The specified test conditions include normal operation and specified fault conditions.

4.202
intrinsically safe system
⟨electrotechnical⟩ assembly in which all electrical circuits that can be used in hazardous (classified) locations are **intrinsically safe circuits** (4.201)

4.203
irritant, noun
⟨sensory/upper respiratory⟩ gas or aerosol that stimulates nerve receptors in the eyes, nose, mouth, throat and respiratory tract, causing varying degrees of discomfort and pain with the initiation of numerous physiological defence responses

NOTE Physiological defence responses include reflex eye closure, tear production, coughing, and bronchoconstriction.

4.204
irritant, noun
〈pulmonary〉 gas or aerosol that stimulates nerve receptors in the lower respiratory tract, which can result in breathing discomfort

NOTE Examples of breathing discomfort are dyspnoea and an increase in respiratory rate. In severe cases, pneumonitis or pulmonary oedema (which can be fatal) can occur some hours after exposure.

4.205
large-scale fire test
fire test (4.132), that cannot be carried out in a typical laboratory chamber, performed on a **test specimen** (4.321) of large dimensions

NOTE A fire test performed on a test specimen of which the maximum dimension is greater than 3 m is usually called a large-scale fire test.

4.206
lateral spread of flame
sideways progression of a **flame front** (4.136)

4.207
lethal concentration 50
LC_{50}
concentration (4.52) of a **toxic gas** (4.336) or **fire effluent** (4.105), statistically calculated from concentration-response data, that causes death of 50% of a population of a given species within a specified **exposure time** (4.90) and **post-exposure time** (4.254)

cf. **effective concentration 50** (4.72)

NOTE 1 For fire effluent, typical units are grams per cubic metre ($g \cdot m^{-3}$).

NOTE 2 For a toxic gas, the typical units are microlitres per litre (μL/L) at $T = 298$ K and $P = 1$ atm; see **volume fraction** (4.351).

4.208
lethal exposure dose 50
LCt_{50}
product of LC_{50} (4.207) and the **exposure time** (4.90) over which it is determined

cf. **concentration** (4.52), **effective exposure dose 50** (4.73), **exposure dose** (4.89) and **lethal exposure time 50** (4.209).

NOTE 1 LCt_{50} is a measure of lethal **toxic potency** (4.338).

NOTE 2 For **fire effluent** (4.105), the typical units are grams times minutes per cubic metre ($g \cdot min \cdot m^{-3}$).

NOTE 3 For a **toxic gas** (4.336), typical units are microlitres times minutes per litre ($\mu L \cdot min \cdot L^{-1}$) at $T = 298$ K and $P = 1$ atm; see **volume fraction** (4.351).

4.209
lethal exposure time 50
t_{L50}
exposure time (4.90) to a fixed **concentration** (4.52) of **toxic gas** (4.336) or **fire effluent** (4.105), that causes death to 50 % of a population of a given species

4.210
light, transitive verb
initiate **combustion** (4.46)

cf. **ignite** (4.185)

4.211
light, transitive verb
initiate **flaming combustion** (4.148)

4.212
lighting, noun
first appearance of **flame** (4.133)

4.213
lighting, verb
initiating **flaming combustion** (4.148)

4.214
linear burning rate
burning rate (deprecated)
rate of burning (deprecated)
length of material **burned** (4.28) per unit time under specified conditions

NOTE The typical units are metres per second ($m \cdot s^{-1}$).

4.215
load-bearing criterion "R"
load-bearing capacity
criterion by which the ability of a **building element** (4.25) or structure to sustain an imposed load when exposed to **fire** (4.96) is assessed

NOTE 1 This term is preferred to "load-bearing capacity" within the European Community. It is used by the European fire testing and construction industry and by those who use European standards both inside and outside the EC.

NOTE 2 The term "load-bearing capacity" is preferred within North America. It is used by the American and Canadian fire testing and construction industry and by those who use American and Canadian standards both inside and outside North America.

4.216
lower flammability limit
LFL
minimum **concentration** (4.52) of **fuel** (4.161) vapour in air below which propagation of a **flame** (4.133) does not occur in the presence of an **ignition source** (4.189)

NOTE The concentration is usually expressed as a **volume fraction** (4.351) at a defined temperature and pressure, and expressed as a percentage.

4.217
lowest observed adverse effect level
LOAEL
lowest **exposure dose** (4.89) of a chemical at which there are statistically or biologically significant increases in frequency or severity of adverse effects seen between the exposed population and its appropriate control

4.218
mass burning rate
burning rate (deprecated)
rate of burning (deprecated)
mass of material **burned** (4.28) per unit time under specified conditions

NOTE The typical units are kilograms per second ($kg \cdot s^{-1}$).

4.219
mass calorimeter
apparatus that measures heat by detecting the change in temperature of a specified mass over time

cf. **calorimeter** (4.35) and **heat release rate calorimeter** (4.178)

4.220
mass charge concentration
⟨closed system⟩ mass of the **test specimen** (4.321) placed in a **combustion** (4.46) chamber divided by the chamber volume

NOTE The typical units are grams per cubic metre ($g \cdot m^{-3}$).

4.221
mass charge concentration
⟨open system⟩ mass of the **test specimen** (4.321) divided by the total volume of air passed through the test apparatus

NOTE 1 The definition assumes that the mass is dispersed in the air flow uniformly over time.

NOTE 2 The typical units are grams per cubic metre ($g \cdot m^{-3}$).

4.222
mass loss concentration
⟨closed system⟩ mass of the **test specimen** (4.321) consumed during **combustion** (4.46) divided by the test chamber volume

NOTE The typical units are grams per cubic metre ($g \cdot m^{-3}$).

4.223
mass loss concentration
⟨open system⟩ mass of the **test specimen** (4.321) consumed during **combustion** (4.46) divided by the total volume of air passed through the test apparatus

NOTE 1 The definition assumes that the mass is dispersed in the air flow uniformly over time.

NOTE 2 The typical units are grams per cubic metre ($g \cdot m^{-3}$).

4.224
mass loss rate
test specimen (4.321) mass loss per unit time under specified conditions

NOTE The typical units are grams per second ($g \cdot s^{-1}$).

4.225
mass optical density of smoke
optical density of smoke (4.244) multiplied by a factor, $Vl(\Delta m\, L)$, where V is the volume of the test chamber, Δm is the mass lost from the **test specimen** (4.321), and L is the light path length

NOTE The typical units are square metres per gram ($m^2 \cdot g^{-1}$).

4.226
means of escape
structural means whereby routes intended to be safe are provided for persons to travel from any point in a **built environment** (4.26) to a **place of safety** (4.253)

4.227
mechanical response
⟨building element⟩ measure of **fire** (4.96) induced changes to the deflection, stiffness and **load-bearing capacity** (4.215) of **building elements** (4.25) and the development of openings (cracks) in building elements during **fire exposure** (4.108) as a result of the shrinkage or expansion of materials, spalling, or delamination

4.228
melting behaviour
phenomena accompanying the liquefaction of a material under the influence of heat

NOTE This includes deforming and dripping, but not flaming.

4.229
minimum critical relative humidity
〈electrotechnical〉 relative humidity that causes leakage current to exceed a defined level under specified test conditions

4.230
minimum detection limit
MDL
theoretical lowest measurable **concentration** (4.52)

4.231
minimum ignition temperature
ignition point
minimum temperature at which **sustained combustion** (4.318) can be initiated under specified test conditions

NOTE 1 The minimum ignition temperature implies the application of a thermal stress for an infinite length of time.

NOTE 2 The typical units are degrees Celsius (°C).

4.232
molten drip, noun
falling droplet of material that has been softened or liquefied by heat

NOTE The droplets can be **flaming** (4.134, 4.147) or not flaming.

4.233
movement behaviour
behaviour which enables occupants of a **built environment** (4.26) to reach a **place of safety** (4.253) or **safe refuge** (4.280) once they have begun to evacuate

4.234
movement time
time needed for all of the occupants of a specified part of a **built environment** (4.26) to move to an **exit** (4.86) and pass through it and into a **place of safety** (4.253)

4.235
narcosis
depression of the central nervous system causing reduced awareness and/or impaired physical capability

NOTE In extreme cases, unconsciousness and finally death can occur.

4.236
narcotic
toxicant (4.340) that causes **narcosis** (4.235)

4.237
net heat of combustion
heat of combustion (4.174) when any water produced is considered to be in the gaseous state

NOTE 1 The net heat of combustion is always smaller than the **gross heat of combustion** (4.170) because the **heat released** (4.176) by the condensation of water vapour is not included.

NOTE 2 The typical units are kilojoules per gram ($kJ \cdot g^{-1}$).

4.238
no observed adverse effect level
NOAEL
exposure dose (4.89) of a chemical at which there are no statistically or biologically significant increases in frequency or severity of adverse effects seen between the exposed population and its appropriate control

NOTE Effects can be produced at this exposure dose, but they are not considered to be adverse.

4.239
non-combustible
not capable of undergoing **combustion** (4.46) under specified conditions

NOTE In some regulations a material is classified as being non-combustible even if it is capable of combustion, provided that its **heat of combustion** (4.174) is less than a defined amount.

4.240
non-flammable
not capable of burning with a **flame** (4.133) under specified conditions

4.241
numerical fire model
mathematical representation of one or more of different interconnected phenomena governing the development of a **fire** (4.98)

4.242
obscuration by smoke
reduction in the intensity of light due to its passage through **smoke** (4.293)

cf. **extinction area of smoke** (4.92), **extinction coefficient** (4.93), **opacity of smoke** (4.243), **optical density of smoke** (4.244), **specific extinction area of smoke** (4.301) and **specific optical density of smoke** (4.303)

NOTE 1 In practice, obscuration by smoke is usually measured as the **transmittance** (4.346), which is normally expressed as a percentage.

NOTE 2 Obscuration by smoke causes a reduction in **visibility** (4.350).

4.243
opacity of smoke
ratio of incident light intensity to transmitted light intensity through **smoke** (4.293), under specified conditions

cf. **obscuration by smoke** (4.242)

NOTE 1 Opacity of smoke is the reciprocal of **transmittance** (4.346).

NOTE 2 The opacity of smoke is dimensionless.

4.244
optical density of smoke
measure of the attenuation of a light beam passing through **smoke** (4.293) expressed as the logarithm to the base 10 of the **opacity of smoke** (4.243)

cf. **specific optical density of smoke** (4.303)

NOTE The optical density of smoke is dimensionless.

4.245
oxidation
chemical reaction in which the proportion of oxygen or other electronegative element in a substance is increased

NOTE In chemistry, the term has the broader meaning of a process that involves the loss of an electron or electrons from an atom, molecule or ion.

4.246
oxidizing agent
substance capable of causing **oxidation** (4.245)

NOTE **Combustion** (4.46) is an oxidation.

4.247
oxygen consumption principle
proportional relationship between the mass of oxygen consumed during **combustion** (4.46) and the **heat released** (4.176)

NOTE A value of 13,1 $kJ \cdot g^{-1}$ is commonly used.

4.248
oxygen index
OI
limiting oxygen index
LOI
minimum **volume fraction** (4.351) of oxygen in a mixture of oxygen and nitrogen, at 23 °C ± 2 °C, that just supports **flaming combustion** (4.148) of a material under specified test conditions

NOTE It is usually expressed as a percentage.

4.249
performance-based design
design that is engineered to achieve specified objectives and **acceptance criteria** (4.2)

4.250
phased evacuation
process by which different parts of a **built environment** (4.26) are evacuated in a controlled sequence

EXAMPLE In a multi-storey building, the initially evacuated floors are usually the **fire** (4.98) floor, the floor immediately above, the floor immediately below, and all basement floors.

NOTE Those parts expected to be at greatest risk are evacuated first.

4.251
physical fire model
laboratory process, including the apparatus, the **environment** (4.80) and the **fire test** (4.132) procedure intended to represent a certain phase of a **fire** (4.98)

4.252
piloted ignition
pilot ignition
ignition (4.187) of **combustible** (4.43) gases or vapours by a secondary source of energy such as a **flame** (4.133), **spark** (4.299, 4.300) , electrical arc or **glowing** (4.168) wire

4.253
place of safety
location that is free from danger and from which it is possible to move freely without threat from a **fire** (4.98)

cf. **safe refuge** (4.280)

NOTE In the case of a building fire, it is typically a place outside the building.

4.254
post-exposure time
period of time after the **exposure time** (4.90) during which the effects of exposure are assessed

4.255
ppm (deprecated)

cf. **concentration** (4.52), **volume fraction** (4.351) and **ppm by volume** (4.256 deprecated)

4.256
ppm by volume (deprecated)

cf. **concentration** (4.52), **volume fraction** (4.351) and **ppm** (4.255 deprecated)

4.257
predicted LC_{50}
LC_{50} (4.207) value for the **fire effluent** (4.105) from a **burned** (4.28) **test specimen** (4.321), calculated from **combustion** (4.46) atmosphere analytical chemical data as that **fire effluent** (4.105) **concentration** (4.52) that would yield a **FED** (4.160) value equal to 1 within a specified **exposure time** (4.90) and **post-exposure time** (4.254).

NOTE The typical units are grams per cubic metre ($g \cdot m^{-3}$).

4.258
predicted toxic potency
calculated value of the **toxic potency** (4.338) of **fire effluent** (4.105) from a burned **test specimen** (4.321)

NOTE The value is calculated from a chemical analysis of the fire effluent and existing toxic potency data for the relevant constituents.

4.259
pre-mixed flame
flame (4.133) in which **combustion** (4.46) occurs in an intimate mixture of **fuel** (4.161) and **oxidizing agent** (4.246)

cf. **diffusion flame** (4.69)

4.260
pre-movement behaviour
behaviour occurring during the **pre-movement time** (4.261)

cf. **recognition behaviour** (4.274) and **response behaviour** (4.278)

4.261
pre-movement time
time period after an alarm or **fire** (4.98) cue is transmitted and before occupants first move (or travel) towards an **exit** (4.86)

4.262
pre-wetting
application of water to **fuel** (4.161) surfaces that are in the path of an advancing **flame front** (4.136)

4.263
primary standard
absolute standard to which other related calibrated measuring instruments can be traced

4.264
probabilistic model
fire model (4.116) that treats phenomena as a series of sequential events or states, with mathematical rules to govern the transitions from one event to another and with probabilities assigned to each transfer point

NOTE An example of a transition is that of **ignition** (4.187) becoming **sustained combustion** (4.318).

4.265
progressive smouldering
self-propagating exothermic **oxidation** (4.245) that is not accompanied by **flaming combustion** (4.148)

NOTE It can be accompanied by **glowing** (4.168).

4.266
pyrolysis
chemical decomposition of a substance by the action of heat

NOTE 1 Pyrolysis is often used to refer to a stage of **fire** (4.96) before **flaming combustion** (4.148) has begun.

NOTE 2 In fire science, no assumption is made about the presence or absence of oxygen.

4.267
pyrolysis front
boundary between the region of **pyrolysis** (4.266) and the region of unaffected material at the surface of the material

4.268
pyrophoric material
material capable of **auto-ignition** (4.18) when brought into contact with air

4.269
radiant heat flux
power per unit area emitted, transferred or received in the form of heat radiation

NOTE The typical units are kilowatts per square metre ($kW \cdot m^{-2}$).

4.270
radiative heat transfer
transmission of heat by electromagnetic radiation

4.271
radiometer
instrument that converts **radiant heat flux** (4.269) into an electrical signal

4.272
reaction to fire
response of a **test specimen** (4.321) when it is exposed to **fire** (4.97) under specified conditions in a **fire test** (4.132)

NOTE **Fire resistance** (4.121) is regarded as a special case and is not normally considered as a reaction to fire property.

4.273
real-scale fire test
fire test (4.132) that simulates a given application, taking into account the real scale, the real way the item is installed and used, and the **environment** (4.80)

NOTE Such a fire test normally assumes that the products are used in accordance with the conditions laid down by the specifier and/or in accordance with normal practice.

4.274
recognition behaviour
behaviour occurring during the time period after an alarm or cue of **fire** (4.98) is evident and before occupants begin to respond

cf. **pre-movement behaviour** (4.260) and **response behaviour** (4.278)

4.275
reference fire scenario
fire scenario (4.129) used as the basis of a **fire test** (4.132) that is intended to reproduce specific aspects of a **fire** (4.98) in the **built environment** (4.26)

4.276
required delivered density
RDD
volumetric flow rate of water per unit area that is delivered onto the top horizontal surface of a simulated burning **combustible** (4.43) array, sufficient to cause the **heat release rate** (4.177) of the **fire** (4.96) to decay to a defined low level

NOTE The typical units are millimetres per minute ($mm \cdot min^{-1}$).

4.277
required safe escape time
RSET
time required for escape
calculated time period required for an individual occupant to travel from their location at the time of **ignition** (4.187, 4.188) to a **safe refuge** (4.280) or **place of safety** (4.253)

cf. **available safe escape time** (4.20) and **evacuation time** (4.84)

4.278
response behaviour
behaviour occurring after occupants recognize alarms or cues of **fire** (4.98), and begin to respond to them, but before they begin to evacuate

cf. **pre-movement behaviour** (4.260) and **recognition behaviour** (4.274)

4.279
risk acceptance
decision to accept an estimated level of **fire risk** (4.124), based on either compliance with **acceptance criteria** (4.2) or an explicit decision to modify those criteria

4.280
safe refuge
temporary location that is free from immediate danger from the effects of **fire** (4.98)

NOTE It is, for example, a place where a wheelchair user can wait in relative safety for further assistance. It may also be a waiting area in high-rise buildings that gives people a chance to rest before continuing their **escape** (4.82) to a **place of safety** (4.253).

4.281
scorch, verb
modify the surface of material by limited carbonization due to heat

4.282
screening test
preliminary test used for ascertaining whether a **test specimen** (4.321) is likely to exhibit, or not exhibit, certain characteristics according to a standardized test method

4.283
secondary standard
standard instrument with a calibration traceable to a **primary standard** (4.263)

4.284
self-extinguish, verb
auto-extinguish, verb
cease **combustion** (4.46) without being affected by any external agent

4.285
self-extinguishibility (deprecated)
auto-extinguishibility (deprecated)

cf. **self-extinguish** and **auto-extinguish** (4.284)

4.286
self-extinguishing (deprecated)
auto-extinguishing (deprecated)

cf. **self-extinguish** and **auto-extinguish** (4.284)

4.287
self-heating
⟨chemical⟩ rise in temperature in a material resulting from an exothermic reaction within the material

4.288
self-heating
⟨electrotechnical⟩ heat generated by a powered electrotechnical product resulting in a rise in temperature in the product

4.289
self-ignition temperature (deprecated)

cf. **auto-ignition temperature** (4.19)

4.290
self-propagation of flame
propagation of a **flame front** (4.136) after the removal of any applied energy source

4.291
separating element
physical barrier intended to resist the passage of **fire** (4.97) (4.98) from one side of the barrier to the other side

4.292
small-scale fire test
fire test (4.132) performed on a **test specimen** (4.321) of small dimensions

NOTE A fire test performed on a test specimen of which the maximum dimension is less than 1 m is usually called a small-scale fire test.

4.293
smoke
visible part of **fire effluent** (4.105)

4.294
smoke production
amount of **smoke** (4.293) that is produced in a **fire** (4.96) or **fire test** (4.132)

cf. **extinction area of smoke** (4.92).

NOTE The typical units are square metres (m^2).

4.295
smoke production rate
amount of **smoke** (4.293) produced per unit time in a **fire** (4.96) or **fire test** (4.132)

NOTE 1 It is calculated as the product of the volumetric flow rate of **smoke** (4.293) and the **extinction coefficient** (4.93) of the smoke at the point of measurement.

NOTE 2 The typical units are square metres per second ($m^2 \cdot s^{-1}$).

4.296
smouldering combustion
smoldering combustion CA, US
combustion (4.46) of a material without **flame** (4.133) and without visible light

cf. **glowing combustion** (4.169)

NOTE Smouldering combustion is generally evidenced by an increase in temperature and/or by **fire effluent** (4.105).

4.297
societal risk
measure of **fire risk** (4.124) combining consequences experienced by every affected person and group

4.298
soot
particulate matter produced and deposited during or after **combustion** (4.46)

NOTE Soot usually consists of finely divided particles, mainly carbon, produced by the incomplete combustion of organic materials.

4.299
spark, **noun**
⟨thermal⟩ incandescent particle

4.300
spark, **noun**
⟨electrotechnical⟩ luminous discharge resulting from the dielectric breakdown of a gas between two electrodes

4.301
specific extinction area of smoke
extinction area of smoke (4.92) produced by a **test specimen** (4.321) in a given time period divided by the mass lost from the test specimen in the same time period

NOTE The typical units are square metres per gram ($m^2.g^{-1}$).

4.302
specific heat capacity
heat capacity (4.171) per unit mass

NOTE The typical units are joules per gram per kelvin ($J \cdot g^{-1} \cdot K^{-1}$).

4.303
specific optical density of smoke
optical density of smoke (4.244) multiplied by a geometric factor

NOTE 1 The geometric factor is equal to $Vl(A \cdot L)$, where V is the volume of the test chamber, A is the area of the **exposed surface** (4.88) of the **test specimen** (4.321), and L is the light path length.

NOTE 2 The use of the term “specific” does not denote “per unit mass” but rather denotes a quantity associated with a particular test apparatus and area of the exposed surface of the test specimen.

NOTE 3 The specific optical density of smoke is dimensionless.

4.304
spectroscopy
study of spectra, especially to determine the chemical composition of substances and the physical properties of atoms, molecules, and ions

4.305
sprinkler activation area
total plan area over which sprinklers are designed to operate

NOTE The typical units are square metres (m^2).

4.306
sprinkler application rate
surface density
volumetric flow rate of water, per unit area, from operating sprinklers

NOTE 1 Also called **sprinkler density** (4.307) or **discharge density** (4.307) for horizontal surfaces.

NOTE 2 The typical units are millimetres per minute ($mm \cdot min^{-1}$).

4.307
sprinkler density
discharge density
sprinkler application rate (4.306) on horizontal surfaces

4.308
stoichiometric combustion
combustion (4.46) in which the **equivalence ratio** (4.81) is equal to unity

4.309
stoichiometric mixture
mixture of chemical reactants having proportions in accordance with the equation for a specified chemical reaction

4.310
stoichiometric yield
notional yield
yield (4.354) of a **combustion product** (4.48) in **stoichiometric combustion** (4.308)

NOTE The stoichiometric yield is dimensionless.

4.311
substrate
material that is used or is representative of that used immediately beneath a surface in end-use

EXAMPLES Plasterboard beneath a wall covering, and fibre cement board beneath flooring that is used to represent a concrete slab substrate.

4.312
super-irritant (deprecated)

cf. **irritant** ⟨sensory/upper respiratory⟩ (4.203) and **irritant** ⟨pulmonary⟩ (4.204)

4.313
super-toxicant (deprecated)

cf. **toxicant** and **toxin** (4.341)

4.314
suppression system
system designed for the active stabilization, reduction or elimination of **flame spread** (4.142) or **heat release** (4.176) or **smoke production** (4.294)

4.315
surface burn
combustion (4.46) limited to the surface of a material

cf. **surface flash** (4.316)

4.316
surface flash
movement of **transient flame** (4.344) over the surface of a material without **ignition** (4.187) of its basic structure

cf. **sustained flame** (4.319) and **transient ignition** (4.345)

NOTE 1 If the **surface burn** (4.315) occurs simultaneously or sequentially with surface flash, it is not considered as a part of the surface flash.

NOTE 2 A surface flash is usually considered to exist for a period of time of less than 1 s.

4.317
surface spread of flame
flame spread (4.142) away from the source of **ignition** (4.187) across the surface of a liquid or a solid

4.318
sustained combustion
sustained ignition (deprecated)
combustion (4.46) of a **test specimen** (4.321) that persists for longer than a defined period of time

cf. **sustained flame** (4.319).

NOTE The defined period of time varies across different standards.

4.319
sustained flame
sustained ignition (deprecated)
flame (4.133), on or over the surface of a **test specimen** (4.321), that persists for longer than a defined period of time

cf. **surface flash** (4.316) and **transient flame** (4.344)

NOTE The defined period of time varies across different standards.

4.320
temperature-time curve
⟨standardized⟩ time-related variation of temperature prescribed in a specified way during a standard **fire resistance** (4.121) test

4.321
test specimen
item subjected to a procedure of assessment or measurement

NOTE In a **fire test** (4.132), the item may be a material, product, component, element of construction, or any combination of these. It may also be a sensor that is used to simulate the behaviour of a product.

4.322
thermal conductivity
parameter related to the rate at which heat flows through a material

NOTE 1 The thermal conductivity, k, is equal to $(Q \cdot d)/(A \cdot t \cdot \theta)$, where Q is the amount of heat that flows in time, t, through a material of thickness, d, and cross-sectional area, A, and which has a temperature difference, θ, across it, and where no heat is exchanged with the surroundings.

NOTE 2 The typical units are watts per metre per kelvin ($W \cdot m^{-1} \cdot K^{-1}$).

4.323
thermal decomposition
process whereby the action of heat or elevated temperature on an item causes changes to the chemical composition

NOTE This is different from **thermal degradation** (4.324).

4.324
thermal degradation
process whereby the action of heat or elevated temperature on an item causes a deterioration of one or more properties

NOTE 1 Properties may be, for example, physical, mechanical or electrical.

NOTE 2 This is different from **thermal decomposition** (4.323).

4.325
thermal diffusivity
thermal conductivity (4.322) divided by the product of density and **specific heat capacity** (4.302)

NOTE 1 It is a parameter used in the calculation of heat transfer through solids

NOTE 2 The typical units are square metres per second ($m^2 \cdot s^{-1}$).

4.326
thermal inertia
product of **thermal conductivity** (4.322), density and **specific heat capacity** (4.302)

EXAMPLES The thermal inertia of steel is $2{,}3 \times 10^8$ $J^2 \cdot s^{-1} \cdot m^{-4} \cdot K^{-2}$. The thermal inertia of polystyrene foam is $1{,}4 \times 10^3$ $J^2 \cdot s^{-1} \cdot m^{-4} \cdot K^{-2}$.

NOTE 1 When a material is exposed to a **heat flux** (4.173), the rate of increase of surface temperature depends strongly on the value of the thermal inertia of the material. The surface temperature of a material with a low thermal inertia rises relatively quickly when it is heated, and vice versa.

NOTE 2 The typical units are joules squared per second per metre to the fourth power per kelvin squared ($J^2 \cdot s^{-1} \cdot m^{-4} \cdot K^{-2}$).

4.327
thermal insulation material
material used for the confinement of heat to a particular location

4.328
thermal insulation
⟨fire resistance⟩ ability of a **separating element** (4.291), when exposed to **fire** (4.96) on one side, to restrict the transmission of heat

cf. **fire resistance** (4.121)

4.329
thermal radiation
transfer of thermal energy by electromagnetic waves

4.330
thermal response
temperature profile within an object resulting from an applied **heat flux** (4.173)

4.331
thermally thick solid behaviour
negligible temperature rise on one face of a solid while **heat flux** (4.173) is applied to the opposite face

NOTE This behaviour depends on the **exposure time** (4.90), the level of heat flux, and material properties of the solid.

4.332
thermally thin solid behaviour
negligible temperature gradient within a solid while **heat flux** (4.173) is applied

NOTE This behaviour depends on the **exposure time** (4.90), the level of heat flux, and material properties of the solid.

4.333
total heat flux
sum of **convective heat flux** (4.55) and **radiant heat flux** (4.269)

4.334
total heat flux meter
instrument that measures **total heat flux** (4.333)

4.335
toxic
poisonous

NOTE A poisonous substance produces adverse effects upon a living organism, e.g. irritation, **narcosis** (4.235) or death.

4.336
toxic gas
toxic (4.335) vapour

NOTE In the context of **fire effluent** (4.105), the term is usually applied to a single chemical element or compound.

4.337
toxic hazard
potential for harm resulting from exposure to **toxic** (4.335) **combustion products** (4.48)

cf. **fire hazard** (4.112), **fire risk** (4.124) and **toxic risk** (4.339)

4.338
toxic potency
measure of the amount of **toxicant** (4.340) required to elicit a specific **toxic** (4.335) effect

cf. **effective exposure dose 50** (4.73) and **lethal exposure dose 50** (4.208)

NOTE A small value of toxic potency corresponds to a high **toxicity** (4.341), and vice versa.

4.339
toxic risk
result of the multiplication of

— the probability of occurrence of a **toxic hazard** (4.337) expected in a given technical operation or state, and

— the consequence or extent of injury to be expected on the occurrence of the toxic hazard

NOTE The toxic risk is part of the **fire risk** (4.124).

4.340
toxicant
toxin
toxic (4.335) substance

4.341
toxicity
toxic (4.335) quality

cf. **acute toxicity** (4.5) and **toxic potency** (4.338)

4.342
tracking
arc tracking
⟨electrotechnical⟩ progressive formation of conducting paths that are produced on the surface and/or within a solid insulating material, due to the combined effects of electric stress and electrolytic contamination

cf. **tracking resistance** (4.343)

4.343
tracking resistance
⟨electrotechnical⟩ ability of a material to withstand a test voltage, under specified conditions, without **tracking** (4.342) and without the occurrence of **flame** (4.133)

4.344
transient flame
flame (4.133), on or over the surface of a **test specimen** (4.321), which persists for a defined short period of time

cf. **surface flash** (4.316) and **sustained flame** (4.319)

NOTE The short period of time has been defined in some standards as 4 s.

4.345
transient ignition
occurrence of **transient flame** (4.344) after the withdrawal of the **ignition source** (4.189)

cf. **ignition** (4.187, 4.188) and **flashing** (4.155)

4.346
transmittance
⟨smoke⟩ ratio of transmitted light intensity through **smoke** (4.293) to incident light intensity, under specified conditions

cf. **obscuration by smoke** (4.242)

NOTE 1 Transmittance through smoke is the reciprocal of **opacity of smoke** (4.243).

NOTE 2 The transmittance is dimensionless and is usually expressed as a percentage.

4.347
travel distance
⟨escape from fire⟩ distance that is necessary for a person to travel from any point within a **built environment** (4.26) to the nearest exit, taking into account the layout of walls, partitions and fittings

4.348
ultimate stability failure
change in a **test specimen** (4.321) that is of sufficient magnitude to result in its rupture or collapse, a very short period of time after the change, in a standard **fire resistance** (4.121) test

4.349
upper flammability limit
UFL
maximum **concentration** (4.52) of **fuel** (4.161) vapour in air above which propagation of a **flame** (4.133) will not occur in the presence of an **ignition source** (4.189)

NOTE The concentration is usually expressed as a **volume fraction** (4.351) at a defined temperature and pressure, and expressed as a percentage.

4.350
visibility
maximum distance at which an object of defined size, brightness and contrast can be seen and recognized

4.351
volume fraction
〈gas in a gas mixture〉 ratio of

— the volume that the gas alone would occupy at a defined temperature and pressure, to:

— the volume occupied by the gas mixture at the same temperature and pressure

NOTE 1 The **concentration** (4.52) 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 2 Unless stated otherwise, a temperature of 298 K and a pressure of 1 atm are assumed.

NOTE 3 The volume fraction is dimensionless and is usually expressed in terms of microlitres per litre (μL/L), which is equivalent to cm^3/m^3 or 10^{-6}), or as a percentage.

4.352
volume yield
volume, at 298 K and 1 atm, of a component of **fire effluent** (4.105) divided by the mass loss of the **test specimen** (4.321) associated with the production of that volume

NOTE The typical units are cubic metres per gram ($m^3 \cdot g^{-1}$).

4.353
wicking
transmission of a liquid through or over a particulate or fibrous material by capillary action

4.354
yield
mass of a **combustion product** (4.48) generated during **combustion** (4.46) divided by the mass loss of the **test specimen** (4.321)

NOTE The yield is dimensionless.

Bibliography

[1] ISO 6182-7, *Fire protection — Automatic sprinkler systems — Part 7: Requirements and test methods for early suppression fast response (ESFR) sprinklers*

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