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Houses — Description of performance —

Part 4: Fire safety

Constructions d'habitation — Description des performances —

Partie 4: Sécurité au feu

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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).

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).

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

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 59, *Buildings and civil engineering works*, Subcommittee SC 15, *Framework for the description of housing performance*.

This second edition cancels and replaces the first edition (ISO 15928-4:2011), of which it constitutes a minor revision.

The main changes compared to the previous edition are as follows:

— 3.4, 3.9, 4.2, 5.3, A.4.2, A.4.3, A.5.1.2, A.5.4 and Bibliography have been revised;

— in this Foreword, the name of SC 15 has been changed to a new one.

A list of all parts in the ISO 15928 series can be found on the ISO website.

Introduction

This document is one of a series under the general title *Houses — Description of performance*. The objective of this series is to identify the methods used to describe the performance of houses. The ISO 15928 series is confined to buildings occupied for residential purposes that may be separated or linked horizontally, but not linked vertically, and which have their own access and do not share any common space.

Each part of the ISO 15928 series relates to a separate attribute. The parts of ISO 15928 do not specify levels of performance and they are not intended to replace national standards or regulations, but to provide a standardized framework to enable the development of national standards and regulations in accordance with World Trade Organization (WTO) requirements. The parts of ISO 15928 do not provide design methods and/or design criteria.

Based on the framework provided by the ISO 15928 series, purchasers, regulators and standards writers in their respective countries can describe their requirements in standardized performance terms, as appropriate. Additionally, the manufacturers/providers can respond by describing the performance of their products in a similar manner. The purpose of this document is to provide a standardized system of describing performance that can be used to specify performance requirements and performance levels, or to rate houses in terms of fire safety.

NOTE 1 The WTO *Agreement on technical barriers to trade*, Clause 2.8, states: "Whenever appropriate, members shall specify technical regulations based on product requirements in terms of performance rather than design or descriptive characteristics".

NOTE 2 Annex A provides a commentary on this document.

Houses — Description of performance —

Part 4: Fire safety

1 Scope

This document sets out a method for describing the fire safety performance of houses. It covers user needs, provides performance descriptions, and outlines evaluation processes. It includes the description of relevant parameters for early warning, fire suppression, fire containment, means of escape, control of structural behaviour, and emission and spread of fire effluent.

This document is intended for use in the evaluation of the design and construction of houses, in the international trading of houses or their sub-systems, and in developing risk-management tools for the protection of houses. It does not specify a level of performance and it is not intended to provide a design method and/or criteria.

This document does not cover the performance of houses exposed to wild fire.

NOTE 1 Structural safety and other performance attributes of a house are covered in other parts of the ISO 15928 series.

NOTE 2 The emission of smoke and hot gases from contents in the house when ignited can impact the fire safety performance of a house, but the type or nature of such contents brought into the house is not the subject of the evaluation process.

NOTE 3 The term “wild fire” is used to mean the concept of wild land fire, bush fire and unplanned burning in vegetative fuels, etc.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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, *Buildings and civil engineering works — Vocabulary — Part 1: General terms*

ISO 8421 (all parts), *Fire protection — Vocabulary*

ISO 13943, *Fire safety — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6707-1, ISO 13943 and ISO 8421 (all parts) and the following apply.

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

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
fire
process of combustion characterized by the emission of heat and fire effluent and usually accompanied by smoke, flame, glowing or a combination thereof

[SOURCE: ISO 13943:2008, 4.96, modified — The Note to entry has been removed.]

3.2
fire exposure
extent to which persons, animals or items are subjected to the conditions created by fire

[SOURCE: ISO 13943:2008, 4.108]

3.3
fire scenario
qualitative description of the course of a fire with respect to time, identifying key events that characterize the studied fire and differentiate it from other possible fires

Note 1 to entry: It typically defines the ignition and fire growth processes, the fully developed fire stage, the fire decay stage, and the environment and systems that impact on the course of the fire.

[SOURCE: ISO 13943:2008, 4.129]

3.4
house
building occupied for residential purposes and designed as one unit (dwelling) with its own access

Note 1 to entry: The house can be a separate building or linked horizontally with another house but not linked vertically.

Note 2 to entry: Where houses are linked, each has its own access and does not share any space in common with another.

Note 3 to entry: Where houses are linked, services including those related to energy usage and supply, heating and ventilation may be shared.

Note 4 to entry: Where houses are linked, the wall between the houses is typically designed and constructed to limit the probability of fire spread between houses.

Note 5 to entry: The definition aligns with the concepts of house, housing and dwelling defined in ISO 6707-1.

[SOURCE: ISO 15928-2:2015, 3.5]

3.5
parameters
group of variables used to quantitatively describe performance

3.6
performance
behaviour of houses related to users' needs

[SOURCE: ISO 15928-2:2015, 3.9, modified — reference to "use" has been changed to "user needs".]

3.7
performance description
statement that identifies agents which affect performance in a qualitative manner and establishes how these agents affect the state of the house

3.8
user
person that a house is designed to accommodate

3.9
user needs
general statement of requirements for a house that are regarded as being satisfactory by the user

4 Fire safety performance

4.1 User needs

The fire safety performance of a house, which may affect the safety of the occupants of the house and may also lead to property damage to the house or an adjacent property, shall be such that the risk of the following does not exceed a level acceptable to the user:

a) fire ignition;

b) fire growth;

c) fire spread;

d) inadequate early warning;

e) inadequate means of escape;

f) inadequate time to escape;

g) damage to the house or any adjacent property.

NOTE 1 Risk of economic loss caused by fire damage to the subject house is often addressed through insurance coverage purchased by the house owner.

NOTE 2 Local regulations typically do not include fire safety requirements intended to limit property damage for the subject house.

NOTE 3 The availability and capability of local emergency response services (i.e. municipal firefighting) can often have an impact on the amount of loss (life and property) in a fire. Whether the impact of such services and the fire safety performance of the house is taken into consideration depends on the user of this document and what level of risk they consider acceptable.

4.2 Performance description

The performance description is an expression of the ability of the house, with an appropriate degree of reliability, to withstand fire and provide protection to occupants and adjacent properties when subjected to any accidental fire in terms of the probability of:

a) ignition occurring, either from internal or external causes;

b) a fully developed fire occurring;

c) the occupants having adequate time to safely escape;

d) the fire spreading and damaging nearby properties.

NOTE 1 Performance related to fire safety of occupants can also be assessed in terms of expected risk to life relative to the number of deaths and injuries.

NOTE 2 In this document, the durability of materials is not considered to have a bearing on the fire safety performance of the house.

4.3 Principles for describing fire safety performance

The fire safety performance can be described by the fire exposure, the resistance of the structure under the effect of those fire conditions, and in terms of a combination of some or all of the following:

a) actions relevant to both a smouldering fire scenario and a flaming fire scenario;

b) early warning;

c) fire suppression;

d) containment of fire spread;

e) control of emission and spread of fire effluents;

f) adequate means of escape;

g) control of structural behaviour;

h) the nature of the occupants of the house.

NOTE Behavioural scenarios can be used to consider the different behavioural aspects of the occupants, including evacuation behaviour, movement behaviour, pre-movement behaviour, recognition behaviour and response behaviour.

5 Parameters for the description of performance

The fire safety performance of a house shall, as a minimum, be described by a combination of parameters provided on each of the relevant building elements or building characteristics described in 4.3.

5.1 Parameters for the description of fire actions

The parameters for describing fire actions are:

a) the nature of the fire (e.g. smouldering and flaming fires);

b) the characteristics of the occupants (e.g. number, age, ability, mobility).

5.2 Parameters for describing early warning

The parameters for describing the early warning performance of the house are:

a) number of devices;

b) location of devices;

c) type of devices;

d) interconnectivity between devices within a house, within a building and with the emergency services.

NOTE See the relevant International Standards for guidance on warning devices, listed in A.5.2.

5.3 Parameters for describing fire suppression

The parameters for describing the performance of fixed fire suppression equipment are the presence versus absence, automatic versus manual, type of suppression agent, coverage and density of agent

distribution. Similar parameters apply to portable fire suppression equipment such as manual fire extinguishers.

NOTE Fire suppression efforts by responding emergency fire service personnel can impact fire safety. The user of this document determines whether manual suppression by fire fighters is taken into consideration in evaluating the fire safety performance of the house.

Where taken into consideration, the parameters for describing performance are the type of fire department (volunteer/career), proximity of the fire station and availability of local water supplies.

5.4 Parameters for describing containment of fire spread

The parameters for describing the containment of fire spread are:

a) the resistance to fire spread in terms of the amount of time required for the fire to spread from one room to another, from one storey to another, or from one house to another;

b) the combustibility characteristics of the materials (i.e. ignitability, flame spread, heat release).

5.5 Parameters for describing control of emission and spread of fire effluents

The parameters for describing control of emission and spread of fire effluent are:

a) the nature and concentration of combustion gases;

b) smoke obscuration.

NOTE 1 The emission of fire effluents from the burning contents in a house fire also has an impact on fire safety.

NOTE 2 The impact of the structural elements and finishes on potential spread of hot fire gases and toxic smoke is discussed in 5.4.

5.6 Parameters for describing adequate means of escape

The parameters for describing the adequacy of the means of escape are:

a) the number and location of accessible openings, including those available when normal routes are not available;

b) the maximum travel distance to the nearest accessible opening.

NOTE The occupants and their expected movement behaviour are also critical when considering the minimum “performance” levels for the means of escape.

5.7 Parameters for describing control of structural behaviour

The parameters for control of structural behaviour are described by a combination of control of the collapse mode under fire conditions and the fire resistance of the load bearing system and components.

The parameter for describing the performance relating to the fire resistance of load bearing systems and other structural components is the amount of time the load bearing system and components can maintain their stability during a fire.

NOTE 1 The amount of time an element continues to demonstrate fire resistance is usually measured in minutes (e.g. 15 min, 30 min, 45 min, and 60 min).

NOTE 2 Structural collapse in a fire can be a factor affecting the availability of escape routes and both damage to the subject house as well as damage to a neighbouring house(s)/building(s).