

SLOVENSKI STANDARD

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Požarna klasifikacija gradbenih proizvodov in elementov stavb - 1. del: Klasifikacija po podatkih iz preskusov odziva na ogenj

Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests

Klassifizierung von Bauprodukten und Bauarten zu ihrem Brandverhalten - Teil 1: Klassifizierung mit den Ergebnissen aus den Prüfungen zum Brandverhalten von Bauprodukten

Classement au feu des produits et éléments de construction - Partie 1: Classement à partir des données d'essais de réaction au feu

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ICS:

13.220.50	Požarna odpornost gradbenih materialov in elementov	Fire-resistance of building materials and elements
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Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests

Classement au feu des produits et éléments de construction - Partie 1: Classement à partir des données d'essais de réaction au feu

Klassifizierung von Bauprodukten und Bauarten zu ihrem Brandverhalten - Teil 1: Klassifizierung mit den Ergebnissen aus den Prüfungen zum Brandverhalten von Bauprodukten

This European Standard was approved by CEN on 9 November 2018.

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COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 13501-1:2018) has been prepared by Technical Committee CEN/TC 127 “Fire safety in buildings”, the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2019, and conflicting national standards shall be withdrawn at the latest by September 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13501-1:2007+A1:2009.

In addition to editorial corrections this document includes the reaction to fire classification procedure for linear pipe thermal insulation products.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

CEN, CENELEC and EOTA committees preparing technical specifications, which contain performance requirements against reaction to fire tests, should make reference to the reaction to fire classification given in this European Standard and not refer directly to any specific fire test method.

EN 13501, *Fire classification of construction products and building elements* consists of the following parts:

- *Part 1: Classification using data from reaction to fire tests*
- *Part 2: Classification using data from fire resistance tests, excluding ventilation services*
- *Part 3: Classification using data from fire resistance tests on products and elements used in building service installations: fire resisting ducts and fire dampers*
- *Part 4: Classification using data from fire resistance tests on components of smoke control — systems*
- *Part 5: Classification using data from external fire exposure to roofs tests*
- *Part 6: Classification using data from reaction to fire tests on power, control and communication cables.*

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

EN 13501-1:2018 (E)**Introduction**

The aim of this European Standard is to define a harmonized procedure for the classification of reaction to fire of construction products. This classification is based on the test procedures listed in Clause 5 and the relevant field of application procedures.

This European Standard has been prepared in support of the second essential requirement in the EC Construction Products Regulation (305/2011/EU) and as detailed in the Interpretative Document Number 2: Safety in case of fire (OJ C62 Vol. 37).

Background information on the Commission Delegated Regulation (2016/364) regarding the classification of the reaction to fire performance of construction products is given in Annex A.

The European Commission has drawn up a list of products which, under specified conditions, can be considered to be class A1 without testing. This information is given in the Commission Decision 96/603/EC (OJ L 267 19.10.1966 p23) as amended by 2000/605/EC (OJ L 258 12.10.2000 p36) and 2003/424/EC (OJ L 144 12.6.2003 p9).

Additionally there is a procedure by which certain products can be assigned a particular fire classification without the need for testing. Such products have well established reaction to fire performance and have been agreed by the Standing Committee on Construction. Agreements relating to such products which may be 'classified without further testing' (CWFT) are published in the Official Journal of the EC.

Parts 2, 3 and 4 of this European Standard are concerned with classification resulting from fire resistance tests. Part 5 covers classification resulting from tests for external fire exposure to roofs. Part 6 covers classification resulting from tests for reaction to fire of cables.

NOTE Test reports constitute the basis for extended application reports as explained in EN 15725.

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1 Scope

This document provides the reaction to fire classification procedure for all construction products, including products incorporated within building elements with the exception of power, control and communication cables which are covered by EN 13501-6.

Products are considered in relation to their end use application.

This document applies to three categories, which are treated separately in this document:

- construction products, excluding floorings and linear pipe thermal insulation products;
- floorings;
- linear pipe thermal insulation products.

NOTE For CE marking of construction products under the Construction Product Regulation ((EC) 305/2011) the NPD option can be used when no reaction of fire performance is to be declared.

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.

EN 13823, *Reaction to fire tests for building products - Building products excluding floorings exposed to the thermal attack by a single burning item*

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CEN/TS 15117, *Guidance on direct and extended application*

EN 15725, *Extended application reports on the fire performance of construction products and building elements*

EN ISO 1182, *Reaction to fire tests for products - Non-combustibility test (ISO 1182)*

EN ISO 1716:2010, *Reaction to fire tests for products - Determination of the gross heat of combustion (calorific value) (ISO 1716:2010)*

EN ISO 9239-1, *Reaction to fire tests for floorings - Part 1: Determination of the burning behaviour using a radiant heat source (ISO 9239-1)*

EN ISO 11925-2, *Reaction to fire tests - Ignitability of products subjected to direct impingement of flame - Part 2: Single-flame source test (ISO 11925-2)*

3 Terms, definitions and symbols

3.1 Terms and definitions

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

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

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

3.1.1

product

material, element or component about which information is required

3.1.2

material

single basic substance or uniformly dispersed mixture of substances, e.g. metal, stone, timber, concrete, mineral wool with uniformly dispersed binder or polymers

3.1.3

homogeneous product

product consisting of a single material, having uniform density and composition throughout the product

3.1.4

non-homogeneous product

product that does not satisfy the requirements of a homogeneous product

Note 1 to entry: It is a product composed of one or more components, substantial and/or non-substantial.

3.1.5

substantial component

material that constitutes a significant part of a non-homogeneous product. A layer with a mass/unit area $\geq 1,0 \text{ kg/m}^2$ or a thickness $\geq 1,0 \text{ mm}$ is considered to be a substantial component

3.1.6

non-substantial component

material that does not constitute a significant part of a non-homogeneous product. A layer with a mass/unit area $< 1,0 \text{ kg/m}^2$ and a thickness $< 1,0 \text{ mm}$ is considered to be a non-substantial component

Note 1 to entry: Two or more non-substantial layers that are adjacent to each other (i.e. with no substantial component(s) in between the layers) are regarded as one non-substantial component when they collectively comply with the requirements for a layer being a non-substantial component.

3.1.7

internal non-substantial component

non-substantial component that is covered on both sides by at least one substantial component

3.1.8

external non-substantial component

non-substantial component that is not covered on one side by a substantial component

3.1.9**flooring**

upper layer(s) of a floor, comprising any surface finish with or without an attached backing and with any accompanying underlay, interlayer and adhesives

3.1.10**linear pipe thermal insulation product**

length of insulation product designed to fit around pipes, with a maximum outer insulation diameter of 300 mm

3.1.11**substrate**

product which is used immediately beneath the product about which information is required

Note 1 to entry: For flooring, it is the floor on which it is mounted or the material which represents this floor.

3.1.12**standard substrate**

product which is representative of the substrate used in end-use applications

3.1.13**end use application**

real application of a product, in relation to all aspects that influence the behaviour of that product under different fire situations.

Note 1 to entry: It covers aspects such as its quantity, orientation, position in relation to other adjacent products, and its method of fixing.

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3.1.14**fire performance**

response of a material, product or assembly in a fire

Note 1 to entry: It is often important to understand how materials, products or assemblies behave in real fires as opposed to in fire tests under controlled conditions. Improved fire performance can be exhibited in a variety of ways. For example, longer times to ignition, lower heat release, lower flame spread or lower smoke release could all be evidence of improvements in fire performance.

Note 2 to entry: Compare with the term fire behaviour.

[SOURCE: EN ISO 13943:2017, 3.137]

3.1.15**reaction to fire**

response of a product in contributing by its own decomposition to a fire to which it is exposed, under specified conditions

EN 13501-1:2018 (E)**3.1.16****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: See fire scenario cluster and representative fire scenario .

Note 2 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 will impact on the course of the fire.

Note 3 to entry: Unlike deterministic fire analysis, where fire scenarios are individually selected and used as design fire scenarios, in fire risk assessment, fire scenarios are used as representative fire scenarios within fire scenario clusters.

[SOURCE: EN ISO 13943:2017, 3.152]

3.1.17**reference scenario**

hazard situation used as a reference for a given test method or classification system

3.1.18**fire situation**

stage in the development of a fire, characterised by the nature, severity and size of the thermal attack on the products involved

3.1.19**combustion**

exothermic reaction of a substance with an oxidizing agent

Note 1 to entry: Combustion generally emits effluent accompanied by flames and/or visible light.

[SOURCE: EN ISO 13943:2017, 3.55]
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3.1.20**heat of combustion**

thermal energy produced by combustion of unit of mass of a given substance

Note 1 to entry: It is expressed in joules per kilogram.

[SOURCE: EN ISO 13943:2017, 3.203]

3.1.21**gross heat of combustion (PCS)**

heat of combustion of a substance when the combustion is complete and any produced water is entirely condensed under specified conditions

[SOURCE: EN ISO 13943:2017, 3.198]

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3.1.22**net heat of combustion (PCI)**

heat of combustion when any water produced is considered to be in the gaseous state

Note 1 to entry: The net heat of combustion is always smaller than the gross heat of combustion because the heat released by the condensation of water vapour is not included.

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

Note 3 to entry: The net heat of combustion may be calculated from the gross heat of combustion.

[SOURCE: EN ISO 13943:2017, 3.280]

3.1.23**contribution to fire**

energy released by a product influencing the fire growth both in pre- and post-flashover situations

3.1.24**ignitability**

measure of the ease with which a test specimen can be ignited, under specified conditions

[SOURCE: EN ISO 13943:2017, 3.212]

3.1.25**heat release**

thermal energy produced by *combustion*

Note 1 to entry: The typical unit is J.

[SOURCE: EN ISO 13943:2017, 3.205] <https://standards.iteh.ai/catalog/standards/sist/298ecf1d-cbef-4bf6-b683-55561ae45ee1/sist-en-13501-1-2019>

3.1.26**small fire attack**

thermal attack produced by a small flame like a match or a lighter

3.1.27**level of exposure**

intensity, duration and extent of the thermal attack on a product

3.1.28**flame spread**

vertical flame spread (F_s) is the highest point reached by the flame tip, as evaluated in the test in EN ISO 11925-2

Note 1 to entry: Lateral flame spread is the furthest extent of travel of a sustained flame, as specified in the EN 13823 test.

EN 13501-1:2018 (E)**3.1.29****sustained flaming**

flame on or over the surface of a test specimen, which persists for longer than a defined period of time

Note 1 to entry: The defined period of time varies across different standards.

Note 2 to entry: Typically, the same defined period is used to define “transitory flaming” or “transient flaming” and the specific test method defines the applicable defined period of time.

[SOURCE: EN ISO 13943:2017, 3.380]

3.1.30**fully developed fire**

state of total involvement of combustible materials in a fire

[SOURCE: EN ISO 13943:2017, 3.192]

3.1.31**flashover**

transition to a state of total surface involvement in a fire of combustible materials within an enclosure

[SOURCE: EN ISO 13943:2017, 3.184]

3.1.32**flaming droplets/particles**

material separating from the specimen during the fire test and continuing to flame for a minimum period as described by the test method

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3.1.33**critical heat flux at extinguishment (CHF)**

incident heat flux at the surface of a specimen at the point where the flame ceases to advance and may subsequently go out

Note 1 to entry: The heat flux value reported is based on interpolations of measurements with a non-combustible calibration board.

Note 2 to entry: The typical unit is kW/m².

3.1.34**heat flux at X minutes (HF-X)**

total heat flux received by the specimen at the most distant spread of flame position observed during the first X minutes of the test

Note 1 to entry: The typical unit is kW/m².

3.1.35**critical heat flux (CHF)**

heat flux at which the flame extinguishes (CHF) or the heat flux after a test period of 30 min (HF-30), whichever is the lower value

Note 1 to entry: It is the flux corresponding with the furthest extent of spread of flame within 30 min.

3.1.36**smoke hazard**

potential for injury and/or damage from smoke

3.1.37**FIGRA**

fire growth rate index used for classification purposes

EXAMPLE

For the classes A2 and B, $FIGRA = FIGRA_{0,2MJ}$

For the classes C and D, $FIGRA = FIGRA_{0,4MJ}$

For the classes A2_L, B_L, and C_L, $FIGRA = FIGRA_{0,2MJ}$

For the class D_L, $FIGRA = FIGRA_{0,4MJ}$

3.1.38 **$FIGRA_{0,2MJ}$**

maximum of the quotient of heat release rate from the specimen and the time of its occurrence using a THR-threshold of 0,2 MJ

Note 1 to entry: $FIGRA_{0,2MJ}$ is defined in more detail in EN 13823.

3.1.39 **$FIGRA_{0,4MJ}$**

maximum of the quotient of heat release rate from the specimen and the time of its occurrence using a THR threshold of 0,4 MJ

Note 1 to entry: The $FIGRA_{0,4MJ}$ is defined in more detail in EN 13823.

3.1.40**SMOGRA**

smoke growth rate. The maximum of the quotient of smoke production rate from the specimen and the time of its occurrence

Note 1 to entry: The *SMOGRA* is defined in more detail in EN 13823.

3.1.41**direct field of application**

outcome of a process (involving the application of defined rules) whereby a test result is deemed to be equally valid for variations in one or more of the product properties and/or intended end use applications

3.1.42**extended field of application**

outcome of a process (involving the application of defined rules that may incorporate calculation procedures) that predicts, for a variation of a product property and/or its intended end use application(s), a test result on the basis of one or more test results to the same test standard

3.1.43**extended application result**

predicted result for performance parameter obtained following the process of extended field of application