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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 a partir des données d'essais de réaction au feu

Ta slovenski standard je istoveten z: EN 13501-1:2007

ICS:

13.220.50	Požarna odpornost gradbenih materialov in elementov	Fire-resistance of building materials and elements
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English Version

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

Classification 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 27 November 2006.

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Foreword

This document (EN 13501-1:2007) 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of an identical text or by endorsement, at the latest by August 2007, and conflicting national standards shall be withdrawn at the latest by August 2007.

This document supersedes EN13501-1:2002.

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

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*

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

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.

This European Standard has been prepared in support of the second essential requirement in the EC Construction Products Directive (89/106/EEC) and as detailed in the Interpretative Document Number 2: Safety in case of fire (OJ C62 Vol. 37).

Background information on the Commission Decision 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 and are listed on the Nando-CPD database on the EC website (<http://europa.eu.int/comm/enterprise/construction>).

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.

NOTE If the classification based on the tests and criteria given in Tables 1 and 2 is not appropriate, one or more reference scenarios (representative scale tests typifying agreed hazard scenarios) can be called upon within the context of a defined procedure. This procedure is intended to be the subject of a future European Standard or Commission Decision, on the basis of an agreement between the Commission and the Member States, in consultation with CEN/CENELEC and EOTA.

1 Scope

This European Standard provides the reaction to fire classification procedure for all construction products, including products incorporated within building elements.

Products are considered in relation to their end use application.

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

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

NOTE The treatment of some families of products is still under review and can necessitate amendments to this European Standard (see European Commission Decision 2000/147/EC).

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.

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

EN ISO 1182, *Reaction to fire tests for building products — Non-combustibility test (ISO 1182:2002)*
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EN ISO 1716, *Reaction to fire tests for building products — Determination of the heat of combustion (ISO 1716:2002)*

EN ISO 9239-1, *Reaction to fire tests for floorings — Part 1: Determination of the burning behaviour using a radiant heat source (ISO 9239-1:2002)*

EN ISO 11925-2, *Reaction to fire tests — Ignitability of building products subjected to direct impingement of flame — Part 2: Single-flame source test (ISO 11925-2:2002)*

3 Terms, definitions and symbols

3.1 Terms and definitions

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

NOTE Where the definitions are identical to those in EN ISO 13943, this is indicated.

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

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

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 and not intended for use with cylindrical ducts

3.1.11

substrate

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

NOTE

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

3.1.14**fire performance**

response of an item when exposed to a specific fire (EN ISO 13943)

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

3.1.16**fire scenario**

detailed description of conditions, including environmental, of one or more stages from before ignition to after completion of combustion at a specific location or in a real scale simulation (EN ISO 13943)

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 oxidizer (EN ISO 13943)

NOTE Combustion generally emits effluent accompanied by flames and/or visible light.

3.1.20**heat of combustion**

thermal energy produced by combustion of unit of mass of a given substance (EN ISO 13943)

NOTE It is expressed in joules per kilogram.

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 (EN ISO 13943)

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

heat of combustion of a substance when the combustion is complete and any produced water is in the vapour state under specified conditions (EN ISO 13943)

NOTE The net heat of combustion may be calculated from the gross heat of combustion.

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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 an item can be ignited, under specified conditions (EN ISO 13943)

3.1.25

heat release

calorific energy which is released by the combustion of an item under specified conditions (EN ISO 13943)

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 measured in the test in EN ISO 11925-2

NOTE Lateral flame spread is the furthest extent of travel of a sustained flame, as measured in the EN 13823 test.

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3.1.29

sustained flaming

existence of flame on top over a surface for a minimum period of time (EN ISO 13943)

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NOTE The period of time required will vary across different standards, but it is usually of the order of 10 s.

3.1.30

fully developed fire

state of total involvement of combustible materials in a fire (EN ISO 13943)

3.1.31

flashover

transition to a state of total surface involvement in a fire of combustible materials within an enclosure (EN ISO 13943)

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

3.1.33

critical heat flux at extinguishment (CHF)

incident heat flux (kW/m^2) at the surface of a specimen at the point where the flame ceases to advance and may subsequently go out.

NOTE The heat flux value reported is based on interpolations of measurements with a non-combustible calibration board

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

total heat flux (kW/m^2) received by the specimen at the most distant spread of flame position observed during the first X minutes of the test

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 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 A2L, BL, and CL, $FIGRA = FIGRA_{0,2MJ}$

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

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 $FIGRA_{0,2MJ}$ 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 The $FIGRA_{0,4MJ}$ is defined in more detail in EN 13823.

3.1.40**SMOGR**

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

NOTE The SMOGR is defined in more detail in EN 13823.

3.2 Symbols and abbreviations

The symbols and notations correspond to those given in the appropriate test method.

ΔT temperature rise [K]

Δm mass loss [%]

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F_s	flame spread [mm]
$FIGRA$	fire growth rate index used for classification purposes
$FIGRA_{0,2MJ}$	fire growth rate index at THR threshold of 0,2 MJ
$FIGRA_{0,4MJ}$	fire growth rate index at THR threshold of 0,4 MJ
LFS	lateral flame spread [m]
PCS	gross calorific potential [MJ/kg or MJ/m ²]
PCI	net calorific potential [MJ/kg or MJ/m ²]
$SMOGRA$	smoke growth rate
t_f	duration of sustained flaming [s]
THR_{600s}	total heat release within 600 s [MJ]
TSP_{600s}	total smoke production within 600 s [m ²]
m'	mean value of the set of results of a continuous parameter determined in accordance with the relevant test method using the minimum number of tests as specified in the test method.
m	mean value of the set of results of a continuous parameter determined in accordance with the procedure in 7.3 and used for classification.

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4 Classes of reaction to fire performance

The classes with their corresponding fire performance are given in:

- Table 1 for construction products excluding floorings;
- Table 2 for floorings;
- Table 3 for linear pipe thermal insulation products.

Products classified in a given class are deemed to satisfy all the requirements of any lower class.

Pipe-insulation and insulation of cylindrical ducts with a maximum outer insulation diameter larger than 300 mm and insulation product intended to be used on flat surfaces shall be tested as prescribed in Table 1.

A classification can only be obtained by undertaking the tests required for that particular product. A classification obtained for one product type, e.g. floorings, cannot be interpreted or accepted in a different classification system.

5 Test methods

5.1 General

The following test methods are specified in relation to the envisaged reaction to fire classification. The relevant classification parameters are given in Tables 1, 2 and 3.

5.2 Non-combustibility test (EN ISO 1182)

This test identifies products that will not, or not significantly, contribute to a fire, regardless of their end use.

The test is relevant for the classes A1, A2, A1_{fi}, A2_{fi}, A1_L and A2_L.

5.3 Heat of combustion test (EN ISO 1716)

This test determines the potential maximum total heat release of a product when completely burning, regardless of its end use.

The test is relevant for the classes A1, A2, A1_{fi}, A2_{fi}, A1_L and A2_L.

It allows the determination of both the gross heat of combustion (*PCS*) and the net heat of combustion (*PCI*).

5.4 Single burning item test (EN 13823)

This test evaluates the potential contribution of a product to the development of a fire, under a fire situation simulating a single burning item in a room corner near to that product. The test is relevant for the classes A2, A2_L, B, B_L, C, C_L, D and D_L. Under the conditions specified in 8.3.2 the test is also relevant for the class A1.

5.5 Ignitability test (EN ISO 11925-2)

This test evaluates the ignitability of a product under exposure to a small flame. The test is relevant for the classes B, C, D, E, B_{fi}, C_{fi}, D_{fi}, E_{fi}, B_L, C_L, D_L and E_L.

5.6 Determination of the burning behaviour of floorings using a radiant heat source (EN ISO 9239-1)

This test evaluates the critical radiant flux below which flames no longer spread over a horizontal surface.

The test is relevant for the classes A2_{fi}, B_{fi}, C_{fi} and D_{fi}.

6 Principles for testing and specimen preparation

6.1 General requirements for specimen preparation

Before testing, product specimens shall be prepared and conditioned and, where relevant, mounted in accordance with the relevant test methods, product specifications or other technical specifications. Ageing and washing procedures, if required by the relevant product specifications, are carried out in accordance with that specification.

6.2 Specific requirements for non-combustibility and heat of combustion testing

Non-combustibility and heat of combustion are product characteristics and are thus independent of the end use of the product.

For homogeneous products they are determined directly.

Non-combustibility and heat of combustion of non-homogeneous products are determined indirectly by prescriptive rules, from the data obtained on their substantial and non-substantial components.