
**Požarna klasifikacija gradbenih proizvodov in elementov stavb - 3. del:
Klasifikacija na podlagi podatkov iz preskusov požarne odpornosti proizvodov in
elementov servisnih inštalacij v stavbah: požarno odporne napeljave in požarne
lopute**

Fire classification of construction products and building elements - Part 3: Classification using data from fire resistance tests on products and elements used in building service installations: fire resisting ducts and fire dampers

ITeH STANDARD PREVIEW

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Klassifizierung von Bauprodukten und Bauarten zu ihrem Brandverhalten - Teil 3:
Klassifizierung mit den Ergebnissen aus den Feuerwiderstandsprüfungen an Bauteilen
von haustechnischen Anlagen: Feuerwiderstandsfähige Leitungen und
Brandschutzklappen
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Classement au feu des produits de construction et éléments de bâtiment - Partie 3:
Classement utilisant des données d'essais de résistance au feu de produits et éléments
utilisés dans des installations d'entretien : Conduits et clapets résistants au feu

Ta slovenski standard je istoveten z: EN 13501-3:2005

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| 13.220.50 | Požarna odpornost gradbenih materialov in elementov | Fire-resistance of building materials and elements |
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 13501-3

December 2005

ICS 13.220.50

English Version

**Fire classification of construction products and building elements
- Part 3: Classification using data from fire resistance tests on
products and elements used in building service installations: fire
resisting ducts and fire dampers**

Classement au feu des produits et éléments de bâtiment -
Classement utilisant des données d'essais de résistance
au feu de composants d'installations de services de
ventilation - Partie 3 : Conduits et clapets résistants au feu

Klassifizierung von Bauprodukten und Bauarten zu ihrem
Brandverhalten - Teil 3: Klassifizierung mit den
Ergebnissen aus den Feuerwiderstandsprüfungen an
Bauteilen von haustechnischen Anlagen: feuerfeste
Leitungen und Brandschutzklappen

This European Standard was approved by CEN on 22 September 2005.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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Foreword

This European Standard (EN 13501-3:2005) 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 2006, and conflicting national standards shall be withdrawn at the latest by June 2006.

This European Standard has been prepared under a Mandate given to CEN by the Commission of the European Communities and the European Free Trade Association, and supports essential requirements of the Construction Products Directive.

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

EN 13501 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

EN 13501-3:2005 (E)**Introduction**

The aim of this European Standard is to define a harmonised procedure for the classification for resistance to fire of construction products and elements. This classification is based on the test procedures listed in Clause 2.

This European Standard is prepared in support of the second essential requirement in the EC Construction Products Directive (89/106/CEC), which is detailed in the Interpretative Document number 2 (ID2): Safety in case of fire (OJ C62 Vol 37). It reflects the Commission Decision of 3 May 2000 on the implementation of the Council Directive 89/106/EEC as regards the classification of the resistance to fire performance of construction products, construction works and parts thereof.

The Interpretative Document and the Commission Decision of 3 May 2000 specify performance and classes regarding fire resistance. These classes are identified by designation letters, each of which refers to an important characteristic of fire resistance behaviour.

This European Standard provides for a common understanding for these requirements. It interprets the functional requirements for the different groups of building products and elements and explains the method for deriving their classification on the basis of test results for individual products or elements.

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1 Scope

This European Standard specifies the procedure for classification of the resistance to fire performance of construction products and building elements used as components of building service installations, using data from fire resistance tests which are within the direct field of application of the relevant test method. Classification on the basis of extended application is outside the scope of this European Standard. For extended applications, however, the same classes need to be used as specified in this European Standard.

Products/elements for use in ventilation systems include (excluding smoke and heat exhaust ventilation):

- fire resisting ducts;
- fire dampers.

Relevant test methods which have been prepared for these products/elements are listed in Clause 2.

2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1366-1:1999, *Fire resistance tests for service installations — Part 1: Ducts*

EN 1366-2:1999, *Fire resistance tests for service installations — Part 2: Fire dampers*

EN ISO 13943:2000, *Fire safety — Vocabulary (ISO 13943:1999)*

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3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN ISO 13943:2000, and the following apply.

3.1

direct field of application

the 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

3.2

extended field of application

the 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

3.3

test specimen

element (or part) of building construction provided for the purpose of determining either its fire resistance or its contribution to the fire resistance of another building element

[EN 1363-1:1999]

NOTE For the purposes of this European Standard this definition refers to a specific component of a service installation.

EN 13501-3:2005 (E)**3.4****fire resisting duct**

duct used for the distribution or extraction of air and designed to provide a degree of fire resistance [EN 1366-1:1999]

NOTE Fire resisting ducts may be subject to an additional classification S: smoke leakage.

3.5**fire damper**

mobile closure within a duct which is designed to prevent the passage of fire

[EN 1366-2:1999]

NOTE Fire dampers may be subject to an additional classification S: smoke leakage.

4 Fire scenarios**4.1 General**

Fire resistance shall be assessed using the thermal attack given in 4.2.

NOTE Other heating curves may exist:

- 'smouldering' fire test is only used if the fire resistance performance of the product/element is expected to be reduced by exposure to temperatures associated with the growth stage of a fire. It is, therefore, particularly relevant to products/elements whose performance may be dependent upon high heating rates below approximately 500 °C (as provided during the 'standard temperature/time' curve) for achievement of their classifications (i.e. mainly reactive or intumescent products). Further details relating to the practical application of this curve, and other test parameters, e.g. tolerances, are given in EN 1363-2.
- hydrocarbon curve is another example;
- also for extreme fire scenarios (e.g. traffic tunnels and nuclear plants), more severe conventional curves may be specified. These are not, however, used for the classification of elements according to this European Standard.

4.2 The standard temperature/time curve (post flashover fire)

When applied as a basis for testing, the standard temperature/time relationship shall be applied for the full duration of the test. The relationship, which is a model of a fully developed fire in a compartment, is given by the following relationship:

$$T = 345 \log_{10} (8t + 1) + 20 \quad (1)$$

where

t is the time from the start of the test in minutes, and

T is the mean furnace temperature in °C.

Further details relating to the practical application of this curve, and other test parameters, e.g. tolerances, are given in EN 1363-1.

5 Resistance to fire performance characteristics

5.1 Performance characteristics

5.1.1 Introduction

5.1.2 to 5.1.4 describe which performance characteristics apply to which products/elements.

5.1.2 E – Integrity

Integrity E is the ability of a component of a service installation to prevent the transmission of fire as a result of the passage of significant quantities of flames or hot gases from the fire to the unexposed side, thereby causing ignition either of the non-fire exposed surface or of any material adjacent to that surface.

The assessment of integrity is made on the basis of one or more of the following aspects simultaneously:

- cracks or openings in excess of given dimensions;
- ignition of a cotton pad;
- sustained flaming on the unexposed side;
- leakage in excess of given values.

The integrity shall be determined by all methods during the test. The cotton pad procedure shall be applied until the pad ignites and, once it has ignited, it shall be withdrawn and the test continued until all aspects have been exceeded (the sponsor has the option, however, of stopping the test once the desired level has been reached). The times of each mode of integrity failure shall be recorded.

Classification of integrity is according to whether or not the component is also classified for insulation. Where a component is classified both for integrity E and insulation I, the integrity value shall be that determined by whichever of the four criteria fails first. Where a component is classified E but without an I classification, failure of the cotton pad shall not be taken into account.

When testing fire dampers or fire resisting ducts against the slow heating curve (EN 1363-2), the leakage criteria are applicable. However the leakage rates measured during the first 25 min of the test shall be disregarded.

For dampers, cracks or openings, ignition of cotton pad and sustained flaming on the unexposed side shall be taken into account only for the area around the duct and wall or floor junction. The criterion inside the duct containing the damper shall be the limitation of the leakage rate to $360 \text{ m}^3/(\text{m}^2 \cdot \text{h})$ after the first five minutes of exposure to the standard temperature/time curve.

5.1.3 I – Insulation

Insulation I is the ability of a component of a service installation to withstand fire exposure without the transmission of fire as a result of significant transfer of heat. Transmission shall be limited so that unexposed surfaces or any material in close proximity to those surfaces are not ignited. The component shall also provide a barrier to heat, sufficient to protect people near to it.

5.1.4 S – Smoke leakage

Smoke leakage S is the ability of the component to resist the passage of gases or smoke at ambient temperature and during exposure to the standard temperature/time test. The leakage rate is corrected to 20 °C.

EN 13501-3:2005 (E)**6 Declaration of fire resistance performance****6.1 Classification periods**

All classification periods against any of the characteristics shall be declared in minutes using one of the periods 15, 20, 30, 45, 60, 90, 120, 180 or 240.

NOTE Not all periods apply to all components, and further subclauses show which classification periods apply to which products/elements.

6.2 Designatory letters

For the classification of components of service installations, use shall be made of the designatory letters explained in 5.1.

6.3 Declaration of performance

Combinations of these designatory letters, as appropriate, shall be used as part of the classification of performance. They shall be supplemented by the time, in elapsed completed minutes of the nearest lower class, during which the functional requirements are satisfied.

The classes shall be expressed as follows:

- Et tt (...) tt being the classification period during which the criteria integrity and insulation are satisfied;
- E tt (...) tt being the classification period during which the criterion integrity is satisfied;
- EI tt (...) S tt being the classification period during which the criteria integrity, insulation and smoke leakage are satisfied;
- E tt (...) S tt being the classification period during which the criteria integrity and smoke leakage are satisfied.

Designatory letters within brackets shall include all information on the direction of exposure of the specimen, as specified in 7.2.2.4 and 7.2.3.4.

Thus, the following classes may be defined:

EI 15 (...) S, E30 (...) S, E 60 (...).

Test results shall always be rounded down to the nearest lower class. When characteristics are combined, the time declared is that for the characteristic having the shortest time.

6.4 Combinations of classes

Only those combinations of designatory letters and performance times explained in Clause 7 shall be used for the relevant products/elements.

6.5 Presentation of classification

The classification shall be presented according to the following template:

| | | | | | | | | | | | | |
|---|---|--|---|---|--|---|---|---|---|---|--|---|
| E | I | | t | t | | (| i | ↔ | o |) | | S |
|---|---|--|---|---|--|---|---|---|---|---|--|---|

6.6 Declaration of fire resistance classes in product specifications

Product specifications including descriptive product/element requirements and claiming a given fire resistance classification in accordance with this European Standard shall justify their classification by fire resistance testing. This establishes the performance at an adequate level of confidence, taking into account the possible variations of the components and the production techniques.

The product/element specification shall therefore include the necessary means for control of the relevant properties.

NOTE Suitable characterisation testing of essential and critical components may be needed in support.

7 Classification procedure for fire resistance

7.1 General

7.1.1 Procedure

- a) The envisaged range of products/elements and end use applications to be covered by the classification shall be proposed by the sponsor and includes aspects such as:
 - exposure conditions: the side(s) to be exposed e.g. ducts (inside/outside);
 - dimensions of the component: height, width,
 - boundary and support conditions: restraint, free movement, distance between supports;
 - variation of constructional details;
 - envisaged class(es): i.e. combinations of performance criteria and times.
- b) Taking into account the field of application of test results as specified in the relevant test method, the number of tests, standard temperature/time tests and other exposures, and the specimen to be tested shall be deduced.
- c) Standard fire tests shall be carried out and for each test the times shall be determined, in elapsed minutes, for which the test specimen continues to satisfy the different aspects of the performance criteria.
- d) If more than one test has to be carried out because of the envisaged field of application, the lowest result shall determine the classification for the entire field of application. As the classification is linked to the field of application, results of individual tests may lead to higher ranking for a limited field of application.
- e) Classification reports shall be prepared as shown in Annex A. A report may be issued for any combination of performance parameters and times that are covered by results of tests.

7.1.2 General rules for deducing the number of fire resistance tests

No test shall be duplicated for aspects of repeatability and a single test, unless required otherwise by this European Standard, allows the classification of all components in the field of direct application.

If, however, a wider field of application is envisaged, all relevant aspects may not be covered by a single test and additional tests are then required. Also, the influence of different boundary conditions may require evaluation of additional test specimens.