



Handläggande organ

Byggstandardiseringen, BST

Fastställt

1999-09-24

Utgåva

1

Sida

1 (1+31)

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## Fire resistance tests for non-loadbearing elements – Part 1: Walls

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ICS 13.220.50

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Tryckt i november 1999



EUROPEAN STANDARD

**EN 1364-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 1999

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ICS 13.220.50

English version

## Fire resistance tests for non-loadbearing elements - Part 1: Walls

Essais de résistance au feu des éléments non porteurs -  
Partie 1: Murs

Feuerwiderstandsprüfungen für nichttragende Bauteile -  
Teil 1: Wände

This European Standard was approved by CEN on 18 February 1999.

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.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Foreword

This European Standard 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of an identical text or by endorsement, at the latest by February 2000, and conflicting national standards shall be withdrawn at the latest by February 2000.

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

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

EN 1364 'Fire resistance tests for non-loadbearing elements' consists of the following

Part 1: Walls

Part 2: Ceilings.

Part 3: Curtain walls - full configuration (in course of preparation).

Part 4: Curtain walls - part configuration (in course of preparation).

Part 5: Semi-natural fire test for facades and curtain walls (in course of preparation)

Part 6: External wall systems (in course of preparation).

## **Introduction**

The purpose of this test is to measure the ability of a representative specimen of a non-loadbearing wall to resist the spread of fire from one side to another.

It is applicable to non-loadbearing walls, with and without glazing, non-loadbearing walls consisting almost wholly of glazing and other non-loadbearing internal and external non-loadbearing walls.

It is not applicable to curtain walls (external non-loadbearing walls suspended in front of the floor slab) which are dealt with specifically in prEN 1364-3.

For external fire exposure to a non-loadbearing external wall, the external fire exposure curve given in EN 1363-2 is used.

## **Caution**

The attention of all persons concerned with managing and carrying out this fire resistance test is drawn to the fact that fire testing may be hazardous and that there is a possibility that toxic and/or harmful smoke and gases may be evolved during the test. Mechanical and operational hazards may also arise during the construction of the test elements or structures, their testing and disposal of test residues.

An assessment of all potential hazards and risks to health shall be made and safety precautions shall be identified and provided. Written safety instructions shall be issued. Appropriate training shall be given to relevant personnel. Laboratory personnel shall ensure that they follow written safety instructions at all times.

## 1 Scope

This Part of EN 1364 specifies a method for determining the fire resistance of non-loadbearing walls.

This Standard is used in conjunction with EN 1363-1.

It is applicable to internal non-loadbearing walls with and without glazing, non-loadbearing walls consisting almost wholly of glazing, (glazed non-loadbearing walls) and other non-loadbearing internal and external non-loadbearing walls with and without glazing.

The fire resistance of external non-loadbearing walls can be determined under internal or external exposure conditions. In the latter case the external fire exposure curve given in EN 1363-2 is used.

It is not applicable to:

- i) curtain walls (external non-loadbearing walls suspended in front of the floor slab) which are considered specifically in prEN 1364-3.
- ii) non-loadbearing walls containing door assemblies which shall be tested to EN 1634-1.

Specific requirements relating to the testing of glazing are given in annex A.

## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 1363-1	Fire resistance tests Part 1: General requirements
EN 1363-2	Fire resistance tests Part 2: Alternative and additional procedures
prEN 1364-3	Fire resistance tests for non-loadbearing elements - Part 3: Curtain walls - full configuration
EN 1634-1	Fire resistance tests for door and shutter assemblies - Part 1: Fire doors and shutters
prEN ISO 13943	Fire safety - Vocabulary (ISO/DIS 13943:1998)

## 3 Definitions

For the purposes of this Part of EN 1364, the definitions given in EN 1363-1 and prEN ISO 13943, together with the following, apply:

**3.1 non-loadbearing wall:** A wall designed not to be subject to any load other than its self-weight.

**3.2 internal non-loadbearing wall:** A wall, with or without glazing, which provides fire separation. It may be exposed separately to a fire from either side.

**3.3 external non-loadbearing wall:** A wall forming the external envelope of a building which may be exposed separately to an internal or an external fire.

**3.4 insulated non-loadbearing wall:** A wall, with or without glazing, which satisfies both the integrity and insulation criteria for the anticipated fire resistance period.

**3.5 uninsulated non-loadbearing wall:** A wall which satisfies the integrity and, where required, the radiation criteria for the anticipated fire resistance period, but which is not intended to provide insulation. Such a non-loadbearing wall may consist entirely of uninsulated fire resistant glazing.

**3.6 fire resistant glazing:** A glazing system consisting of one or more transparent or translucent panes with a suitable method of mounting, with e.g frames, seals, fixing materials etc, capable of satisfying the appropriate fire resistance criteria.

**3.7 insulated glazing:** Fire resistant glazing which satisfies both the integrity and insulation criteria for the anticipated fire resistance period.

**3.8 uninsulated glazing:** Fire resistant glazing which satisfies the integrity and, where required, the radiation criteria for the anticipated fire resistance period but which is not intended to provide insulation.

**3.9 glazed elements:** Building elements with one or more (light transmissive) panes, that are built in a frame with fixings and seals.

**3.10 pane:** A single piece of glass.

**3.11 aspect ratio:** The ratio of the height of a pane to its width.

**3.12 mullion:** A vertical framing member separating and supporting two adjacent panes of glass or panels.

**3.13 transom:** A horizontal framing member separating and supporting two adjacent panes of glass or panels.

**3.14 standard supporting construction:** A form of construction used to close off the furnace and to support the non-loadbearing wall being evaluated and which has known resistance to thermal distortion.

**3.15 plinth:** A form of standard supporting construction that reduces the height of the opening by raising the support base to accommodate the test specimen.

#### 4 Test equipment

In addition to the test equipment specified in EN 1363-1, and if applicable EN 1363-2, the following is required:

A test frame shall be provided, the rigidity of which shall be evaluated by applying an expansion force within the frame at mid-way between two opposite members of the frame, and measuring the increase in the internal dimensions at these positions. This evaluation shall be conducted in both directions of the frame and the increase of the internal dimension shall be measured.

The increase in the internal dimensions of the test frame shall not exceed 5 mm with an applied force of 25 kN.

## 5 Test conditions

The heating and pressure conditions and the furnace atmosphere shall conform to those given in EN 1363-1 or if applicable, EN 1363-2.

## 6 Test specimen

### 6.1 Size

If, in practice, the height or width of the construction is 3m or smaller, then that dimension of the test specimen shall be tested at full size. If any dimension of the construction is greater than 3m, then that dimension shall be tested at not less than 3m.

### 6.2 Number

The number of test specimens shall be as given in EN 1363-1. However, where information is required under different exposure conditions or where the construction is to be evaluated with and without glazing, additional tests shall be undertaken for each situation using separate test specimens.

### 6.3 Design

#### 6.3.1 General

The test specimen shall be either:

- a) fully representative of the construction intended for use in practice, including any surface finishes and fittings which are essential and may influence its behaviour in the test,  
or,
- b) be designed to obtain the widest applicability of the test result to other similar constructions.

The design features which influence fire performance that should be included to give the widest application can be derived from the field of direct application, clause 13.  
Guidance on the design of glazed test specimens is given in annex A.

The test specimen shall not contain mixtures of different types of construction e.g. brick or blocks in a wall unless this is fully representative of the construction in practice. Where the test specimen can incorporate at least two full width boards, the free edge shall be adjacent to a full size board on the exposed face. When it is not possible to incorporate two full size boards into the test specimen, the single full size board shall be located in the centre of the specimen, with smaller boards of equal width on each side. The smaller boards shall not be less than 500 mm wide. Where the smaller boards would be less than 500 mm wide, only one shall be used next to the free edge of the specimen. (see figure 1).

### **6.3.2 Restraint**

When, in practice the test specimen is not larger than the front opening of the furnace, then the edges of the test specimen shall be restrained as in practice. Where, in practice the width of the construction is larger than the front opening of the furnace, one vertical edge shall be left unrestrained and there shall be a gap of 25mm to 50mm between the free edge of the test specimen and the test frame. This gap shall be packed with a resilient non-combustible material, e.g. mineral fibre, to provide a seal without restricting freedom of movement. The remaining edges shall be restrained as in practice.

### **6.4 Construction**

The test specimen shall be constructed as described in EN 1363-1.

### **6.5 Verification**

Verification of the test specimen shall be carried out as described in EN 1363-1.

## **7 Installation of test specimen**

### **7.1 General**

The test specimen shall be installed in the test frame and, if used, the supporting construction, as in practice.

The test specimen shall be mounted as near as possible to the exposed vertical plane of the test frame or supporting construction as appropriate, unless in practice a different position is used.

The whole area of the test construction shall be exposed to the heating conditions.

### **7.2 Standard supporting construction**

If the size of the test specimen is smaller than the opening in the test frame then it shall be installed in the test frame using one of the following approaches:

- a) Where the height of the test specimen is smaller than the height of the test frame opening, then a plinth shall be provided to reduce the opening to the required height. The plinth shall possess sufficient stability for the test specimen and shall be selected from one of the rigid standard supporting constructions in EN 1363-1.
- b) Where the width of the test specimen is smaller, a standard supporting construction shall be provided on the vertical sides of the opening selected from either the rigid or flexible standard supporting constructions given in EN 1363-1.

### **7.3 Non-standard supporting construction**

If the test specimen is mounted in a supporting construction not given in EN 1363-1, then the result will only be valid for non-loadbearing walls mounted in the construction as tested.

## **8 Conditioning**

The test construction shall be conditioned in accordance with EN 1363-1.

## **9 Application of instrumentation**

### **9.1 Thermocouples**

#### **9.1.1 Furnace thermocouples (plate thermometers)**

Plate thermometers shall be provided in accordance with EN 1363-1. There shall be at least one for every 1,5 m<sup>2</sup> of the exposed surface area of the test construction. The plate thermometers shall be oriented so that side 'A' faces the back wall of the furnace.

#### **9.1.2 Unexposed face thermocouples**

##### **9.1.2.1 General**

For uninsulated non-loadbearing walls, glazed or unglazed, the temperature of the unexposed face is not required to be measured and no thermocouples are therefore required to be attached.

For walls with an anticipated insulation performance in excess of 5 min, thermocouples of the type specified in EN 1363-1 shall be attached to the unexposed face for the purpose of obtaining the average and the maximum surface temperatures. Examples of location of unexposed face thermocouples are given in figures 2 to 15.

General rules for the attachment and exclusion of thermocouples given in EN 1363-1 shall apply.

##### **9.1.2.2 Average temperature**

###### **a) Uniform non-loadbearing walls**

For test specimens which are uniform with respect to their expected thermal insulation, the average temperature of the unexposed face shall be measured by means of five thermocouples, one located close to the centre of the specimen and one close to the centre of each quarter section. Some typical examples are shown in figures 2, 4, 6, 9 and 14.

###### **b) Non-uniform non-loadbearing walls**

For test specimens of non-uniform non-loadbearing walls, i.e. those which contain discrete areas <sup>3</sup> 0.1 m<sup>2</sup> expected to exhibit different levels of insulation performance e.g. glazing, each discrete area shall be individually monitored for average temperature rise. The average temperature rise shall be measured by thermocouples distributed over each discrete area. One thermocouple shall be provided for every 1,5 m<sup>2</sup> or part thereof of the specimen. A minimum of two thermocouples for each discrete area shall be provided. A typical example is shown in figure 12.

##### **9.1.2.3 Maximum temperature**

For determination of maximum temperature thermocouples shall be applied to the unexposed face as follows:-

- a) at the head of the specimen at mid-width.
- b) at the head of the specimen in line with a stud/mullion.