



SLOVENSKI STANDARD

SIST EN 1364-2:1999

01-december-1999

Preskusi požarne odpornosti nenosilnih elementov – 2. del: Stropovi

Fire resistance tests for non-loadbearing elements - Part 2: Ceilings

Feuerwiderstandsprüfungen für nichttragende Bauteile - Teil 2: Unterdecken

Essais de résistance au feu des éléments non porteurs - Partie 2: Plafonds

Ta slovenski standard je istoveten z: **EN 1364-2:1999**

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ICS:

13.220.50	Požarna odpornost gradbenih materialov in elementov	Fire-resistance of building materials and elements
91.060.30	Stropi. Tla. Stopnice	Ceilings. Floors. Stairs

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1364-2

August 1999

ICS 13.220.50

English version

Fire resistance tests for non-loadbearing elements - Part 2: Ceilings

Essais de résistance au feu des éléments non porteurs -
Partie 2: Plafonds

Feuerwiderstandsprüfungen für nichttragende Bauteile -
Teil 2: Unterdecken

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.

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of an identical text or by endorsement, at the latest by February 2000, and conflicting national standards shall be withdrawn at the latest by February 2000.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

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

Part 1: Walls

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Part 2: Ceilings

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

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

Introduction

Testing of ceilings is carried out in two modes:

- a) with fire from below the ceiling, with no cavity above, or
- b) with fire from above the ceiling where the fire is contained in a closed cavity.

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.

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Safety note: Monitoring for integrity by the cotton pad or other means and insulation by use of the roving thermocouple from above a test specimen (in the case of fire from below) or within a void beneath a fire test specimen (in the case of fire from above) can be hazardous unless the risks associated with these practices are considered and appropriate precautions taken to protect operators from radiation, smoke, hot gases and from contact with furnace flame.

Operators shall not reach over the test specimen (in the case of fire from below) or enter the void beneath a test specimen (in the case of fire from above) to carry out inspection tests of any type during the test.

1 Scope

This part of EN1364 specifies a method for determining the fire resistance of ceilings, which in themselves possess fire resistance independent of any building element above them. This Standard is used in conjunction with EN 1363-1.

The method is applicable to ceilings, which are either suspended by hangers or fixed directly to a supporting frame or construction, and to self supporting ceilings.

Within this test method, the ceiling is exposed to fire, with the exposure being applied either:

- a) from below the ceiling, or
- b) from above the ceiling to simulate fire within the cavity above the ceiling.

The contribution to fire resistance which a suspended ceiling may provide as a protective membrane to loadbearing elements is determined using a procedure which will be given in an ENV in preparation.

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 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 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 ceiling: A non-loadbearing element of a building construction designed to provide horizontal fire separation.

3.2 self-supporting ceiling: A ceiling with a span from wall to wall, without any additional suspension devices.

3.3 suspended ceiling: A ceiling which is suspended from a supporting construction.

3.4 cavity: The space between the upper surface of the ceiling and the underside of any floor, roof or its supporting construction.

3.5 test specimen: The full ceiling specimen submitted for test, including hangers, fittings, insulating materials and features such as lighting, ventilation and access and inspection panels.

3.6 standard supporting construction: A horizontal loadbearing construction to which a suspended ceiling is attached for the test.

3.7 fittings: All devices penetrating the ceiling, e.g lighting and ventilation systems not otherwise covered by a specific fire test.

4 Test equipment

The test equipment shall be as specified in EN 1363-1 or, if appropriate, EN 1363-2.

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.

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6 Test specimen

6.1 Size

6.1.1 Self-supporting ceilings exposed to fire from below or from above

When the ceiling in practice is equal to or greater than the size of the furnace opening, then it shall be tested at a size of at least (4 x 3) m. The span of the ceiling shall be in the direction of the larger dimension. (see also 6.3.2).

When the ceiling in practice is smaller than (4 x 3) m, in either direction, then it shall be tested full size and the furnace aperture shall be provided with closures of adequate fire resistance around the extremities of the test specimen.

6.1.2 Suspended ceilings exposed to fire from below and above

The test specimen shall be of size such that at least (4 x 3) m is exposed to the furnace conditions. The direction of the main components (see 6.3.2) shall be in the direction of the larger dimension.

When the ceiling in practice is smaller than (4 x 3) m, in either direction, then it shall be tested full size and the furnace aperture shall be provided with closures of adequate fire resistance around the extremities of the test specimen.

6.2 Number

A single test specimen shall be tested unless the most onerous test configuration, identified in 6.3.2, cannot be defined, in which case separate tests shall be carried out for each configuration.

6.3 Design

6.3.1 General

The test specimen shall be fully representative of the ceiling intended for use in practice. It shall model the edges between the ceiling and walls, the joints and jointing materials to be used in practice. It shall be designed to be mounted only from below.

The test specimen shall include any appropriate fittings which are an essential part of the specimen and may influence its behaviour in test.

Where fixtures and fittings do not form an integral part of the ceiling but may be fitted subsequently in a manner that may affect the fire resistance of the ceiling, then these shall be the subject of a separate full size test incorporating those fittings. (standards.iteh.ai)

When the ceiling design includes both longitudinal and transverse joints, the test specimen shall include both such joints.

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6.3.2 Orientation

If the longitudinal and transverse directions of the ceiling are constructed differently, the performance of the test specimen may vary depending upon the direction aligned with the longitudinal axis. The specimen shall be designed to represent the most onerous condition by arranging the more critical components parallel to the longitudinal axis. If the more onerous condition cannot be identified, two separate tests shall be carried out with the components arranged both parallel and perpendicular to the longitudinal axis.

6.3.3 Support conditions

The following support conditions for the ceilings are specified and shall be followed unless the sponsor requests otherwise. In this case the differing support conditions shall be described in the test report and the validity of the results shall be restricted accordingly.

Cavity barriers incorporated as a part of the test specimen are allowed.

When the test specimen is full size in both directions, it shall be fixed as in practice. When it is smaller in one or both directions than in practice the following support conditions shall apply:

- a) for a self supporting ceiling, there shall be one free edge which shall be in the direction of the main supporting member. There shall be no allowance made for longitudinal movement of the edges or thermal expansion in either direction, other than that provided for in the ceiling system.

- b) for a suspended ceiling, with fire from below, all edges shall be fixed to the specimen support frame without any allowance for longitudinal movement of the edges or thermal expansion in either direction, other than that provided for within the ceiling system.
- c) for a suspended ceiling, with fire from above, two adjacent edges shall be fixed to the specimen support frame without any allowance for longitudinal movement of the edges or thermal expansion in either direction other than that provided for within the ceiling system. No gap around the specimen is allowed on the four edges.

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 as far as possible in a manner representative of its use in practice. It shall be mounted from below without access from above, and be installed by the same method and procedures recommended in the installation manual which shall be provided by the sponsor.

The test specimen shall be mounted in a test frame or furnace to prohibit thermal elongation. Grid members shall be tightly fitted to a test frame or furnace walls in order that the thermal expansion behaviour of grid members and expansion devices may be correctly evaluated.

Profiles bearing the various components or panels of the ceiling shall be installed against each other without any gap, unless a gap or gaps is required for design purposes. In this case the gap or gaps shall be representative of practice and shall be installed within the test specimen and not at its perimeter.

Provisions for sealing the furnace shall be made when the test specimen is smaller than the furnace aperture.

7.2 Standard supporting construction

7.2.1 General

The test specimen shall be installed using a standard supporting construction according to the fire exposure conditions being evaluated as follows:

7.2.2 Exposure to fire from below

The test specimen shall be open to the laboratory on its upper face (see figure 1).

For suspended ceilings, these shall be supported by steel beams, IPE 140 or equivalent which shall be of sufficient length to provide an exposed length of at least 4 m. The supported length (span) shall be the exposed length plus up to half the width of the bearing.

7.2.3 Exposure to fire from above

The upper fire compartment closure shall form a cavity of height of 1,5 m to 2 m.

For a self supporting ceiling, an unloaded fire compartment closure satisfying the specifications for furnace linings, for example, aerated concrete slabs with a thickness of approximately 120 mm, as shown in figure 2, shall be used to close the furnace.

For a suspended ceiling, the fire compartment closure and supporting construction, as shown in figure 3, shall comprise aerated concrete slabs with a thickness of approximately 120 mm density (650 ± 200) Kg/m³, supported by two steel beams, 2 m apart and no closer than 500 mm to the edge, of type IPE 140 or equivalent, with an exposed length of at least 4 m. The fire resistance of the concrete slabs and steel beams shall be not less than the anticipated fire resistance of the ceiling under test, nor not greater than 30 mins above the anticipated fire resistance of the ceiling under test. For further information on loading see 10.1.

8 Conditioning

All components and materials of the test construction shall be conditioned as specified in EN 1363-1.

9 Application of instrumentation

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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 m² of the exposed surface area of the test construction. The plate thermometers shall be oriented so that side 'A' faces the floor of the furnace in the case of fire from below. Plate thermometers shall be oriented so side 'A' faces the standard supporting construction in the case of fire from above.

For test specimens with less than 6 m² exposed area, a minimum of four plate thermometers shall be used.

9.1.2 Unexposed surface thermocouples

9.1.2.1 Average temperature

Five thermocouples shall be evenly distributed over the test specimen to monitor the average temperature of the unexposed surface of the ceiling. They shall be placed with one in the centre of the ceiling and one at the centre of each quarter section.

When testing corrugated or ribbed ceiling constructions the number of thermocouples on the unexposed face shall be increased to six to provide an equal number at points of maximum and minimum ceiling thickness.