

ICS 91.220

English Version

**Test methods for determining the contribution to the fire  
resistance of structural members - Part 1: Horizontal protective  
membranes**

Méthodes d'essai pour déterminer la contribution à la  
résistance au feu des éléments de construction - Partie 1:  
Membranes de protection horizontales

Prüfverfahren zur Bestimmung des Beitrages zum  
Feuerwiderstand von tragenden Bauteilen - Teil 1:  
Horizontal angeordnete Schutzbekleidungen

This Technical Specification (CEN/TS) was approved by CEN on 15 November 2005 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

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## Foreword

This Technical Specification (CEN/TS 13381-1:2005) has been prepared by Technical Committee CEN/TC 127 "Fire safety in buildings", the secretariat of which is held by BSI.

This Technical Specification 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. As there was little experience in carrying out these tests in Europe, CEN/TC127 agreed that more experience should be built up during a pre-standardization period before agreeing text as European Standards. Consequently all other Parts are being prepared as European Prestandards.

This Technical Specification is one of a series of standards for evaluating the contribution to the fire resistance of structural members by applied fire protection materials. Other Parts of this ENV are:

- Part 2: Vertical protective membranes,
- Part 3: Applied protection to concrete members,
- Part 4: Applied protection to steel members,
- Part 5: Applied protection to concrete/profiled sheet steel composite members,
- Part 6: Applied protection to concrete filled hollow steel columns,
- Part 7: Applied protection to timber members.

The fire protection capacity of the horizontal protective membrane can be nullified by the presence of combustible materials in the cavity above the membrane. The applicability of the results of the assessment is limited according to the quantity and position of such combustible materials within that cavity. The amount of combustible material permissible in the cavity should be given in national regulations.

Annexes A and B are normative.

### Caution

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

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

The specific health and safety instructions contained within this European Technical Specification should be followed.

**WARNING:** When performing this test method, laboratories should expect that there may be significant quantities of smoke released. This smoke release is expected to be very significant where the fire test involves timber and timber based components. Laboratories should ensure that appropriate smoke extraction facilities are provided.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this CEN Technical Specification: 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.

## 1 Scope

This Part of this European Prestandard specifies a test method for determining the ability of a horizontal protective membrane, when used as a fire resistant barrier, to contribute to the fire resistance of horizontal structural building members.

This European Technical Specification contains the fire test which specifies the tests which are carried out whereby the horizontal protective membrane, together with the structural member to be protected, is exposed to a fire test according to the procedures defined herein. The fire exposure, to the temperature/time curve given in EN 1363-1, is applied to the side which would be exposed in practice and from below the membrane itself.

The test method makes provision, through specified optional additional procedures, for the collection of data which can be used as direct input to the calculation of fire resistance according to the processes given within EN 1992-1-2, EN 1993-1-2, EN 1994-1-2 and EN 1995-1-2.

A related test method for determining the contribution to the fire protection of vertical structural members by vertical protective membranes is given in Part 2 of this ENV.

This European Technical Specification also contains the assessment which provides information relative to the analysis of the test data and gives guidance for the interpretation of the results of the fire test, in terms of loadbearing capacity criteria of the protected horizontal structural member.

The limits of applicability of the results of the assessment arising from the fire test are defined, together with permitted direct application of the results to different structures, membranes and fittings.

This European Technical Specification applies only where there is a gap and a cavity between the horizontal protective membrane and the structural building member. Otherwise the test methods in ENV 13381-3, ENV 13381-4 or ENV 13381-5, as appropriate, apply.

Tests shall be carried out without additional combustible materials in the cavity.

Annex A gives details of assessing the performance of the ceiling when exposed to a semi-natural fire.

## 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 1363-1, *Fire resistance tests — Part 1: General requirements*

EN 1365-2, *Fire resistance tests for loadbearing elements — Part 2: Floors and roofs*

EN 1992-1-1, *Eurocode 2: Design of concrete structures — Part 1-1: General rules and rules for buildings*

EN 1992-1-2, *Eurocode 2: Design of concrete structures — Part 1-2: General rules — Structural fire design*

EN 1993-1-1, *Eurocode 3: Design of steel structures — Part 1-1: General rules and rules for buildings*

EN 1993-1-2, *Eurocode 3: Design of steel structures — Part 1-2: General rules — Structural fire design*

EN 1994-1-1, *Eurocode 4: Design of composite steel and concrete structures — Part 1-1: General rules and rules for buildings*

EN 1994-1-2, *Eurocode 4: Design of composite steel and concrete structures — Part 1-2: General rules — Structural fire design (including Technical Corrigendum 1:1995)*

EN 1995-1-1, *Eurocode 5: Design of timber structures — Part 1-1: General rules and rules for buildings*

EN 1995-1-2, *Eurocode 5: Design of timber structures — Part 1-2: General rules — Structural fire design*

ENV 13381-4, *Test methods for determining the contribution to the fire resistance of structural members — Part 4: Applied protection to steel members*

ENV 13381-5, *Test methods for determining the contribution to the fire resistance of structural members — Part 5: Applied protection to concrete/profiled sheet steel composite members*

ENV 13381-7, *Test methods for determining the contribution to the fire resistance of structural members — Part 7: Applied protection to timber members*

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

ISO 8421-2, *Fire protection — Vocabulary — Part 2: Structural fire protection*

### 3 Terms and definitions, symbols and units

#### 3.1 Terms and definitions

For the purposes of this European Technical Specification, the terms and definitions given in EN 1363-1, EN ISO 13943 and ISO 8421-2 and the following apply:

##### 3.1.1

##### **horizontal structural building member**

horizontal structural element of building construction which is loadbearing, separating and which is fabricated from concrete, steel, steel/concrete composite or timber

##### 3.1.2

##### **horizontal protective membrane**

any horizontal membrane or ceiling lining plus any supporting framework, hangers, fixings and any insulation materials which is either suspended from or attached directly to a structural building member, or is self supporting and fixed beneath a structural building member, and which is intended to give additional fire resistance to that structural building member

The horizontal protective membrane does not form any part of any loadbearing part of the structure and can comprise multiple layers of materials

##### 3.1.3

##### **separating gap**

distance between the uppermost surface of the horizontal protective membrane and the lowest surface of the underside of the structural building member

##### 3.1.4

##### **cavity**

whole void or voids between the uppermost surface of the horizontal protective membrane and the highest surface of the underside of the structural building member