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

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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 13381-1:2020 sisaldab Euroopa standardi EN 13381-1:2020 ingliskeelset teksti.	This Estonian standard EVS-EN 13381-1:2020 consists of the English text of the European standard EN 13381-1:2020.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 01.07.2020.	Date of Availability of the European standard is 01.07.2020.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 13.220.50, 79.060.20

EUROPEAN STANDARD

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EN 13381-1

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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 Brandschutzbekleidungen

This European Standard was approved by CEN on 7 May 2020.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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

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European foreword

This document (EN 13381-1:2020) 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 January 2021, and conflicting national standards shall be withdrawn at the latest by January 2021.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13381-1:2014.

The main changes with respect to the previous edition are listed below:

Clarifications regarding the following items:

a) determination of the characteristic surface temperature curve;

b) limits of applicability (addition of integrity and insulation performances in the tables);

c) assessment when the semi-natural fire test is performed (Annex A).

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

This document is one of a series of standards for evaluating the contribution to the fire resistance of structural members by applied fire protection materials. The other parts of this series are:

— *Part 2: Vertical protective membranes*,

— *Part 3: Applied protection to concrete members*,

— *Part 4: Applied passive 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*,

— *Part 8: Applied reactive protection to steel members*,

— *Part 9: Applied fire protection systems to steel beams with web openings.*

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 is typically given in national regulations.

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

Introduction

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 document should be followed.

WARNING: When performing this test method, laboratories should expect that there can 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.

1 Scope

This document 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 standard horizontal structural building members as defined in 6.4.2.

Test of horizontal protective membrane installed under a specific non-standard floor should be tested according to EN 1365-2.

This document 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 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.

This document 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.

In special circumstances, where specified in national building regulations, there can be a need to subject the protection material to a smouldering curve. The test for this and the special circumstances for its use are detailed in Annex C.

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 document 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 EN 13381-3, EN 13381-4 or EN 13381-5, as appropriate, apply.

Tests are intended to 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 documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1363-1:2020, *Fire resistance tests — Part 1: General Requirements*

EN 1363-2, *Fire resistance tests — Part 2: Alternative and additional procedures*

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*

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

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

EN 312, *Particleboards — Specifications*

EN 823, *Thermal insulating products for building applications — Determination of thickness*

EN 12467, *Fibre-cement flat sheets — Product specification and test methods*

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

EN 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 member*

EN 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)*

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 document, the terms and definitions given in EN 1363-1, EN ISO 13943 and ISO 8421-2 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp/ui

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
horizontal membrane or ceiling lining that does not form any part of any loadbearing part of the structure and can comprise multiple layers of materials, together with 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, as for example ceiling tiles resting on a light supporting frame, ceiling boards, metal trays, plastered and similar ceilings not directly applied to the underside of the structural member