

Test methods for determining the contribution to the fire resistance of structural members - Part 7: Applied protection to timber members

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 13381-7:2019 sisaldab Euroopa standardi EN 13381-7:2019 ingliskeelset teksti.	This Estonian standard EVS-EN 13381-7:2019 consists of the English text of the European standard EN 13381-7:2019.
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English Version

## Test methods for determining the contribution to the fire resistance of structural members - Part 7: Applied protection to timber members

Méthodes d'essai pour déterminer la contribution à la résistance au feu des éléments de construction - Partie 7: Protection appliquée aux éléments en bois

Prüfverfahren zur Bestimmung des Beitrages zum Feuerwiderstand von tragenden Bauteilen - Brandschutzmaßnahmen für Holzbauteile

This European Standard was approved by CEN on 26 November 2018.

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## European foreword

This document (EN 13381-7:2019) 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of an identical text or by endorsement, at the latest by December 2019, and conflicting national standards shall be withdrawn at the latest by March 2021.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 ENV 13381-7:2002.

This European Standard 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 standard are:

*Part 1: Horizontal protective membranes.*

*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 8: Applied reactive protection to steel members.*

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

*Part 10: Applied protection to solid steel rods.*

The main changes compared to ENV 13381-7:2002 are:

- a) New test procedures have been introduced to address the different fields of applications of fire protection systems on solid timber products and timber frame assemblies in horizontal and vertical position and the design models available in EN 1995-1-2.
- b) Loaded tests are performed using large-scale test specimens depending on their intended use on walls or ceilings.
- c) The start of charring and the stickability is measured with thermocouples on the timber member(s) surface of a beam specimen or a timber frame specimen.
- d) Charring behind a fire protection system is measured using charring specimens embedded in the cavity insulation of a timber frame specimen.
- e) Interpolation of results for different thicknesses of fire protection system is not allowed.



- f) The use of test results for different orientations obtained in tests in one orientation is specified.

WARNING - The attention of all persons concerned with managing and carrying out this fire resistance test, is drawn to 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 standard should be followed.

This document has been prepared under a standardization request given to CEN/CENELEC by the European Commission and the European Free Trade Association.

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.

## 1 Scope

This document specifies test methods for determining the contribution of fire protection kits to the fire resistance of structural timber members.

Such fire protection kits include claddings, sprayed fire protection and reactive coatings.

The method is applicable to all fire protection kits used for the protection of timber members. These can be fixed directly, totally or in part, to the timber member and can include an air gap between the fire protection kit and the timber member, as an integral part of its design.

Evaluation of timber constructions protected by horizontal or vertical protective membranes are the subject of EN 13381-1 or EN 13381-2 respectively.

The test method is applicable to the determination of the contribution of fire protection kits to the fire resistance of loadbearing timber structural members including floors, roofs, walls, beams and columns.

This document contains the fire test which specifies the test to be carried out to determine the ability of the fire protection kit at a specified thickness to delay the temperature rise throughout the timber member, to determine the ability of the fire protection kit at a specified thickness to remain coherent and fixed to the timber member and to provide data for determining the charring rate of the protected test member, when exposed to the standard temperature/time curve according to the procedures defined herein. This document is not appropriated to classify the tested assembly according to EN 13501-2.

The test to subject reactive protection material to a smouldering temperature time fire curve and the special circumstances for this are detailed in Annex G.

The fire test methodology makes provision for the collection and presentation of data which can be used as direct input to the calculation of fire resistance of timber members in accordance with the procedures given in EN 1995-1-2.

A description of the relationship of this test method and the assessment of the results obtained therefrom to EN 1995-1-2 and guidelines for the use of this test method in accordance with that standard are given in Annex B.

This document also contains the assessment which indicates how the analysis of the test data should be made and gives guidance to the procedures by which interpolation should be undertaken.

The limits of applicability of the results of the assessment arising from the fire test are defined, together with the direct application of the results to different timber constructions with the specified thickness and fixation of the applied fire protection kit tested.

## 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 301, *Adhesives, phenolic and aminoplastic, for load-bearing timber structures — Classification and performance requirements*

EN 338, *Structural timber — Strength classes*

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

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

EN 1995-1-2:2004, *Eurocode 5: Design of timber structures — Part 1-2: General — Structural fire design*

EN 1363-1, *Fire resistance tests — Part 1: General Requirements*

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

EN 1365-1, *Fire resistance tests for loadbearing elements — Part 1: Walls*

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

EN 1365-3, *Fire resistance tests for loadbearing elements — Part 3: Beams*

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

EN 13162, *Thermal insulation products for buildings — Factory made mineral wool (MW) products — Specification*

EN 13381-1, *Test methods for determining the contribution to the fire resistance of structural members — Part 1: Horizontal protective membranes*

EN 13381-8, *Test methods for determining the contribution to the fire resistance of structural members — Part 8: Applied reactive protection to steel members*

EN 14080, *Timber structures - Glued laminated timber and glued solid timber — Requirements*

EN 14081-1, *Timber structures — Strength graded structural timber with rectangular cross section — Part 1: General requirements*

EN 15425, *Adhesives — One component polyurethane (PUR) for load-bearing timber structures — Classification and performance requirements*

EN ISO 2808, *Paints and varnishes — Determination of film thickness (ISO 2808)*

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

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

ISO 834-12, *Fire resistance tests — Elements of building construction — Part 12: Specific requirements for separating elements evaluated on less than full scale furnaces*

### 3 Terms, 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, together with 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 <http://www.iso.org/obp>

##### 3.1.1

##### **board**

part of a building assembly of typically not reactive material, used as a part or as fire protection material

##### 3.1.2

##### **cavity insulation**

stone wool insulation in batts of reaction to fire class A1 and a density of 30 kg/m<sup>3</sup> ( $\pm 5$  kg/m<sup>3</sup>) to be placed between timber joists or studs over their full depth in timber frame assemblies tested according this standard to achieve a loading of and heat accumulation in the fire exposed fire protection kit

##### 3.1.3

##### **char line**

border-line between char layer and the residual cross section assumed to be equal with the position of the 300 degree Celsius isotherm

##### 3.1.4

##### **charring depth**

distance from the original surface of the timber member to the char line

##### 3.1.5

##### **charring specimen**

non-load bearing, instrumented, laminated timber specimen containing one temperature measurement station incorporated into a large scale test specimen, into a large scale test or a model scale test specimen to follow the charring behind a fire protection kit

##### 3.1.6

##### **failure time**

time at which failure of the fire protection kit occurs, due to detachment of a significant area or sudden significant temperature rise upon the initially protected timber surface

##### 3.1.7

##### **fire protection material**

material or combination of materials applied to the surface of a timber structural member for the purpose of increasing its fire resistance