

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

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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English Version

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

Méthodes d'essai pour déterminer la contribution à la
résistance au feu des éléments de construction - Partie 8:
Protection réactive appliquée aux éléments en acier

Prüfverfahren zur Bestimmung des Beitrages zum
Feuerwiderstand von tragenden Bauteilen - Teil 8: Reaktive
Ummantelung von Stahlbauteilen

This European Standard was approved by CEN on 4 March 2010.

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Foreword

This document (EN 13381-8:2010) 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of an identical text or by endorsement, at the latest by October 2010, and conflicting national standards shall be withdrawn at the latest by October 2010.

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

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

This document is compatible with prEN 13381-4 and specifically deals with the testing and assessment of reactive coatings designed to protect structural steel.

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 series are:

- *Part 1: Horizontal protective membranes*
- *Part 2: Vertical protective membranes*
- *Part 3: Applied protection to concrete members*
- *Part 4: Applied passive protection products to steel members*
- *Part 5: Applied protection to concrete/profile sheet steel composite members*
- *Part 6: Applied protection to concrete filled hollow steel columns*
- *Part 7: Applied protection to timber members*

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 standard should be followed.

According to the CEN/CENELEC Internal Regulations, the national standards organizations 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This European Standard specifies a test method for determining the contribution made by applied reactive fire protection systems to the fire resistance of structural steel members, which can be used as beams or columns. It considers only sections without openings in the web. It is not directly applicable to structural tension members without further evaluation. Results from analysis of I or H-sections are directly applicable to angles, channels and T-sections for the same section factor, whether used as individual elements or as bracing. This European Standard does not apply to solid bar or rod.

It covers fire protection systems that involve only reactive materials and not to passive fire protection materials as defined in this document.

The evaluation is designed to cover a range of thicknesses of the applied fire protection material, a range of steel sections, characterized by their section factors, a range of design temperatures and a range of valid fire protection classification periods.

This European Standard contains the fire test procedures, which specifies the tests which should be carried out to determine the ability of the fire protection system to remain coherent and attached to the steelwork, and to provide data on the thermal characteristics of the fire protection system, when exposed to the standard temperature/time curve specified in EN 1363-1.

In special circumstances, where specified in National Building Regulations, there can be a need to subject reactive protection material to a smouldering curve, the test for this and the special circumstances for its use are described in Annex A.

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 steel structural members in accordance with the procedures given in EN 1993-1-2 and EN 1994-1-2.

This European Standard also contains the assessment, which prescribes how the analysis of the test data shall be made and gives guidance on the procedures by which interpolation should be undertaken.

The assessment procedure is used to establish:

- a) on the basis of temperature data derived from testing loaded and unloaded sections, a correction factor and any practical constraints on the use of the fire protection system under fire test conditions (the physical performance);
- b) on the basis of the temperature data derived from testing short steel sections, the thermal properties of the fire protection system (the thermal performance).

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 steel sections and grades and to the fire protection system.

The results of the test and assessment obtained according to this European Standard are directly applicable to steel sections of I and H cross sectional shape and hollow sections.

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 1363-1:1999, *Fire resistance tests — Part 1: General requirements*

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

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

EN 1365-4, *Fire resistance tests for loadbearing elements — Part 4: Columns*

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 10025-1, *Hot rolled products of structural steels — Part 1: General technical delivery conditions*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using test data from reaction to fire tests*

EN 60584-1, *Thermocouples — Part 1: Reference tables (IEC 60584-1:1995)*

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

ISO 8421-2:1987, *Fire protection — Vocabulary — Part 2: Structural fire protection*

ETAG 018, *Guideline for European Technical Approval of Fire Protective Products — Part 2: Reactive Coatings For Fire Protection of Steel Elements*

3 Terms, definitions, symbols and units

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1363-1:1999, EN ISO 13943:2000 and ISO 8421-2:1987 and the following apply.

3.1.1

steel member

element of building construction which is loadbearing and fabricated from steel

NOTE For the purpose of this document the steel used in the testing is of the same type.

3.1.2

reactive fire protection material

reactive material which is specifically formulated to provide a chemical reaction upon heating such that its physical form changes and in so doing provides fire protection by thermal insulative and cooling effects

3.1.3

passive fire protection material

material which does not change its physical form on heating, providing protection by virtue of its physical or thermal properties

NOTE This may include materials containing water which, on heating evaporates to produce cooling effects.

3.1.4

fire protection system

fire protection material together with a specified primer and top coat if applicable