



**SLOVENSKI STANDARD**  
**kSIST FprEN 13823:2010**  
**01-marec-2010**

---

**Preskusi odziva gradbenih proizvodov na ogenj - Gradbeni proizvodi razen talnih oblog, izpostavljeni toplotnemu delovanju enega samega gorečega predmeta**

Reaction to fire tests for building products - Building products excluding floorings exposed to the thermal attack by a single burning item

Essais de réaction au feu des produits de construction - Produits de construction à l'exclusion des revêtements de sol exposés à une sollicitation thermique provoquée par un objet isolé en feu

**Ta slovenski standard je istoveten z: FprEN 13823**

---

**ICS:**

13.220.50	Požarna odpornost gradbenih materialov in elementov	Fire-resistance of building materials and elements
-----------	---	--

**kSIST FprEN 13823:2010**

**en,fr,de**



EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**FINAL DRAFT**  
**FprEN 13823**

December 2009

---

ICS 13.220.50; 91.060.01; 91.100.01

Will supersede EN 13823:2002

English Version

## Reaction to fire tests for building products - Building products excluding floorings exposed to the thermal attack by a single burning item

This draft European Standard is submitted to CEN members for unique acceptance procedure. It has been drawn up by the Technical Committee CEN/TC 127.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, 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 United Kingdom.

**Warning** : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

**Management Centre: Avenue Marnix 17, B-1000 Brussels**

<b>Contents</b>	<b>Page</b>
Foreword.....	4
Introduction .....	5
1 Scope.....	6
2 Normative references .....	6
3 Terms and definitions.....	6
4 Test facility .....	7
4.1 General.....	7
4.2 Test room.....	7
4.3 Materials.....	10
4.4 Test apparatus.....	10
4.5 Smoke exhaust system .....	12
4.6 General measurement section equipment .....	12
4.7 Other general equipment.....	13
5 Test specimen .....	14
5.1 Dimensions of specimen.....	14
5.2 Mounting of specimen .....	14
5.2.1 Mounting as in end use application .....	14
5.2.2 Standard mounting .....	14
5.3 Installation of the specimen wings in the trolley .....	17
5.4 Number of specimens.....	17
6 Conditioning .....	17
7 Principle .....	18
8 Test procedure .....	18
8.1 General.....	18
8.2 Testing operations .....	18
8.3 Visual observation and manual recording of data .....	19
8.3.1 General.....	19
8.3.2 Pre-test conditions.....	19
8.3.3 Lateral flame spread on the long wing .....	19
8.3.4 Flaming particles or droplets.....	20
8.3.5 End of test conditions .....	22
8.3.6 Recorded events .....	22
8.4 Automated recording of data .....	22
8.5 Early termination of test .....	23
9 Expression of results.....	23
10 Test report .....	23
<b>Annex A (normative) Calculation procedures .....</b>	<b>25</b>
A.1 General.....	25
A.1.1 General remarks.....	25
A.1.2 Calculations to be performed on the test data .....	25
A.1.3 Calculations to be performed on calibration data .....	26
A.1.4 Standard data set.....	26
A.2 Synchronization of data .....	26
A.2.1 O <sub>2</sub> and CO <sub>2</sub> synchronization with $T_{ms}$ .....	26
A.3 Checking equipment response.....	28
A.3.1 Temperature readings .....	28
A.3.2 Drift in gas concentration measurement .....	28

A.3.3	Drift in light attenuation measurement .....	28
A.4	Exposure period .....	29
A.5	Heat output .....	29
A.5.1	Calculation of heat release rate ( <i>HRR</i> ).....	29
A.5.2	Calculation of <i>THR</i> ( <i>t</i> ) and <i>THR</i> <sub>600s</sub> .....	32
A.5.3	Calculation of <i>FIGRA</i> <sub>0,2MJ</sub> and <i>FIGRA</i> <sub>0,4MJ</sub> (fire growth rate indices) .....	33
A.6	Smoke production.....	34
A.6.1	Calculation of smoke production rate ( <i>SPR</i> ) .....	34
A.6.2	Calculation of <i>TSP</i> ( <i>t</i> ) and <i>TSP</i> <sub>600s</sub> .....	37
A.6.3	Calculation of <i>SMOGRA</i> (smoke growth rate index) .....	37
A.7	Calculations for calibrations.....	38
A.7.1	Propane heat release .....	38
Annex B	(informative) Precision of test method .....	39
B.1	General remarks and results .....	39
B.2	Calculation of test results .....	40
B.3	Statistical analysis .....	40
B.4	Statistical results .....	40
Annex C	(normative) Calibration procedures.....	44
C.1	Procedures for separate pieces of equipment.....	44
C.1.1	General.....	44
C.1.2	Oxygen analyser adjustment .....	44
C.1.3	Oxygen analyser output noise and drift .....	44
C.1.4	Carbon dioxide analyser adjustment .....	45
C.1.5	Check of propane mass flow controller.....	45
C.1.6	Light system calibration.....	45
C.2	System response calibrations .....	46
C.2.1	Burner switch response time.....	46
C.2.2	Burner heat output step calibration .....	48
C.2.3	Heptane calibration.....	51
C.2.4	Velocity profile factor <i>k<sub>t,v</sub></i> .....	53
C.2.5	Flow factor <i>k<sub>f</sub></i> .....	55
Annex D	(informative) Calibration procedures .....	56
D.1	Procedures for separate pieces of equipment.....	56
D.1.1	General.....	56
D.1.2	Oxygen analyser adjustment .....	56
D.1.3	Carbon dioxide analyser adjustment .....	56
D.1.4	Check of propane mass flow controller.....	56
D.1.5	Optical filter check .....	57
D.2	Check of the thermal attack on the specimens .....	58
D.2.1	General.....	58
D.2.2	Procedure .....	58
Annex E	(normative) Design drawings.....	59
Annex F	(informative) Data file format.....	94
Annex G	(informative) Record sheet .....	97

**FprEN 13823:2009 (E)**

**Foreword**

This document (FprEN 13823:2009) has been prepared by Technical Committee CEN/TC 127 “Fire safety in buildings”, the secretariat of which is held by BSI.

This document is currently submitted to the Unique Acceptance Procedure.

This document will supersede EN 13823:2002.

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 Council Directive 89/106/EEC.

## Introduction

The classification of the reaction to fire performance of construction products established by EC Decision 2000/147/EC (OJEU L50 of 23.2.2000) defines in Table 1 the reaction to fire classes for building products excluding floorings. The relevant test methods for determining the reaction to fire are being prepared by CEN/TC 127.

### Safety warning

The attention of all persons concerned with managing and carrying out the tests described in this standard is drawn to the fact that fire testing can be hazardous and that toxic and/or harmful smoke and gases can be produced during the test.

An assessment of all potential hazards and risks to health should be made and safety precautions should be identified and provided. Smoke and gases should be removed from the workplace. 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.

Special precautions are required for the propane gas supply system.

- The equipment, for example tubes, couplings, flow meters, should be approved for propane.
- The burner should be equipped with a remote-controlled ignition device, for example a pilot flame or a glow wire. There should be a warning system for leaking gas and a valve for immediate and automatic cut-off of the gas supply in case of extinction of the ignition flame. The pilot flames can be ignited directly by an operator in the test room, however, no one should be present in the test room during ignition of a burner.
- It should be possible to operate the switch between auxiliary and main (primary) burner and the preceding main valve (to open or stop the propane supply) from outside the test room.

Special precautions are required for the extinction of burning specimens.

When the extinction is carried out because of intensive combustion of the specimens, it is recommended that a second operator is ready to intervene. Means for extinguishing should be available (e.g. since the heat output during intensive combustion can damage the apparatus).

## FprEN 13823:2009 (E)

### 1 Scope

This European Standard specifies a method of test for determining the reaction to fire performance of construction products excluding floorings, and excluding products which are indicated in Table 1 of the EC Decision 2000/147/EC, when exposed to thermal attack by a single burning item (SBI). The calculation procedures are given in Annex A. Information on the precision of the test method is given in Annex B. The calibration procedures are given in Annexes C and D, of which C is a normative annex.

NOTE This European Standard has been developed to determine the reaction to fire performance of essentially flat products. The treatment of some families of products, e.g. linear products (pipes, ducts, cables etc) can need special rules.

### 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 13238, *Reaction to fire tests for building products - Conditioning procedures and general rules for selection of substrates*

EN 13501-1:2007, *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)*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 13943:2000 and EN 13501-1:2007 and the following apply.

#### 3.1

##### **backing board**

calcium silicate panel used to back the specimen that can be placed directly against a free-standing test specimen or at a distance from it

#### 3.2

##### **specimen**

piece of a product, which is to be tested

NOTE This can include the mounting technique used in its end-use application. This also can include an air gap and/or a substrate where appropriate.

#### 3.3

##### **substrate**

product which is used immediately beneath the product about which information is required

#### 3.4

##### **$THR_{600s}$**

total heat release from the specimen in the first 600 s of exposure to the main (primary) burner flames