



**NSAI**  
Standards

Irish Standard  
I.S. EN 13823:2020

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

**I.S. EN 13823:2020**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

*This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):*

*NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.*

*This document is based on:*

EN 13823:2020

*Published:*

2020-05-20

*This document was published under the authority of the NSAI and comes into effect on:*

2020-06-19

ICS number:

13.220.50

91.060.01

91.100.01

NOTE: If blank see CEN/CENELEC cover page

NSAI  
1 Swift Square,  
Northwood, Santry  
Dublin 9

T +353 1 807 3800  
F +353 1 807 3838  
E standards@nsai.ie  
W NSAI.ie

Sales:  
T +353 1 857 6730  
F +353 1 857 6729  
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

## National Foreword

I.S. EN 13823:2020 is the adopted Irish version of the European Document EN 13823:2020, Reaction to fire tests for building products - Building products excluding floorings exposed to the thermal attack by a single burning item

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

For relationships with other publications refer to the NSAI web store.

**Compliance with this document does not of itself confer immunity from legal obligations.**

*In line with international standards practice the decimal point is shown as a comma (,) throughout this document.*

This page is intentionally left blank

EUROPEAN STANDARD

**EN 13823**

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2020

ICS 13.220.50; 91.060.01; 91.100.01

Supersedes EN 13823:2010+A1:2014

English Version

## 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

Prüfungen zum Brandverhalten von Bauprodukten - Thermische Beanspruchung durch einen einzelnen brennenden Gegenstand für Bauprodukte mit Ausnahme von Bodenbelägen

This European Standard was approved by CEN on 17 February 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

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

<b>Contents</b>	<b>Page</b>
European foreword.....	5
Introduction .....	6
1 Scope .....	7
2 Normative references .....	7
3 Terms and definitions .....	7
4 Test facility .....	9
4.1 General.....	9
4.2 Test room .....	9
4.3 Materials.....	10
4.4 Test apparatus.....	11
4.5 Smoke exhaust system .....	13
4.6 General measurement section equipment.....	13
4.7 Other general equipment.....	14
5 Test specimen.....	15
5.1 Dimensions of specimen.....	15
5.2 Mounting of specimen .....	16
5.3 Installation of the specimen wings in the trolley .....	18
5.4 Number of specimens .....	19
6 Conditioning.....	19
7 Principle .....	19
8 Test procedure .....	20
8.1 General.....	20
8.2 Testing operations.....	20
8.3 Visual observation and manual recording of data .....	21
8.4 Automated recording of data.....	23
8.5 Early termination of test.....	24
9 Expression of results.....	24
10 Test report.....	25
Annex A (normative) Calculation procedures .....	26
A.1 General.....	26
A.1.1 General remarks.....	26
A.1.2 Calculations to be performed on the test data.....	27
A.1.3 Calculations to be performed on calibration data.....	27
A.1.4 Standard data set.....	27
A.2 Synchronization of data .....	27
A.3 Checking equipment response .....	29
A.3.1 Temperature readings .....	29
A.3.2 Drift in gas concentration measurement.....	29
A.3.3 Drift in light attenuation measurement.....	29

A.4	Exposure period .....	30
A.5	Heat output.....	30
A.5.1	Calculation of heat release rate ( <i>HRR</i> ) .....	30
A.5.2	Calculation of <i>THR(t)</i> and <i>THR</i> <sub>600s</sub> .....	34
A.5.3	Calculation of <i>FIGRA</i> <sub>0,2MJ</sub> and <i>FIGRA</i> <sub>0,4MJ</sub> (fire growth rate indices).....	34
A.6	Smoke production.....	35
A.6.1	Calculation of smoke production rate ( <i>SPR</i> ) .....	35
A.6.2	Calculation of <i>TSP(t)</i> and <i>TSP</i> <sub>600s</sub> .....	38
A.6.3	Calculation of <i>SMOGRA</i> (smoke growth rate index).....	39
A.7	Calculations for calibrations – Propane heat release .....	40
Annex B (informative) Precision of test method.....		41
B.1	General remarks and results .....	41
B.2	Calculation of test results.....	42
B.3	Statistical analysis.....	43
B.4	Statistical results.....	43
Annex C (normative) Calibration procedures.....		50
C.1	Procedures for separate pieces of equipment.....	50
C.1.1	General.....	50
C.1.2	Oxygen analyser adjustment.....	50
C.1.3	Oxygen analyser output noise and drift.....	50
C.1.4	Carbon dioxide analyser adjustment.....	51
C.1.5	Light system calibration .....	51
C.2	System response calibrations.....	52
C.2.1	Burner switch response time.....	52
C.2.2	Burner heat output step calibration .....	54
C.2.3	Heptane calibration.....	57
C.2.4	Velocity profile factor <i>k<sub>t,v</sub></i> .....	59
C.2.5	Flow factor <i>k<sub>t</sub></i> .....	61
Annex D (informative) Calibration procedures .....		62
D.1	Procedures for separate pieces of equipment.....	62
D.1.1	General.....	62
D.1.2	Oxygen analyser adjustment.....	62
D.1.3	Carbon dioxide analyser adjustment .....	62
D.1.4	Check of propane mass flow controller.....	63
D.1.5	Optical filter check.....	63
D.2	Check of the thermal attack on the specimens.....	64
D.2.1	General.....	64

**EN 13823:2020 (E)**

<b>D.2.2 Procedure.....</b>	<b>64</b>
<b>Annex E (normative) Design drawings.....</b>	<b>65</b>
<b>Annex F (informative) Data file format .....</b>	<b>100</b>
<b>Annex G (informative) Record sheet.....</b>	<b>103</b>
<b>Bibliography.....</b>	<b>104</b>



## **European foreword**

This document (EN 13823:2020) 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 November 2020, and conflicting national standards shall be withdrawn at the latest by November 2020.

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 13823:2010+A1:2014.

This document has been prepared under a mandate given to CEN 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.

**EN 13823:2020 (E)****Introduction**

The classification of the reaction to fire performance of construction products established by Delegated Regulation (EU) 2016/364 defines 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 document 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).

## 1 Scope

This document specifies a method of test for determining the reaction to fire performance of construction products excluding floorings, and excluding products which are indicated in Delegated Regulation (EU) 2016/364, 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 Annex C is a normative annex.

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

EN 13501-1:2018, *Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests*

EN 60584-1:2013, *Thermocouples — Part 1: EMF specifications and tolerances*

EN ISO 13943:2017, *Fire safety — Vocabulary (ISO 13943:2017)*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 13943:2017 and EN 13501-1:2018 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

#### **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 1 to entry: 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.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

- 
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
  - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-