BS EN 13501-5:2016



BSI Standards Publication

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Fire classification of construction products and building elements

Part 5: Classification using data from external fire exposure to roofs tests

bsi.

National foreword

This British Standard is the UK implementation of EN 13501-5:2016. It supersedes BS EN 13501-5:2005+A1:2009 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee FSH/22/-/8, Fire resistance tests for external fire exposure for roofs.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Published by BSI Standards Limited 2016

ISBN 978 0 580 86860 3

ICS 13.220.50; 91.060.20

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 June 2016.

Amendments/corrigenda issued since publication

Date	Text affected

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13501-5

June 2016

ICS 13.220.50; 91.060.20

Supersedes EN 13501-5:2005+A1:2009

English Version

Fire classification of construction products and building elements - Part 5: Classification using data from external fire exposure to roofs tests

Classement au feu des produits et éléments de construction - Partie 5: Classement utilisant des données d'essais au feu des toitures exposées à un feu extérieur

Klassifizierung von Bauprodukten und Bauarten zu ihrem Brandverhalten - Teil 5: Klassifizierung mit den Ergebnissen aus Prüfungen von Bedachungen bei Beanspruchung durch Feuer von außen

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European foreword

This document (EN 13501-5:2016) has been prepared by Technical Committee CEN/TC 127 'Fire safety in buildings', the secretariat of which is held by BSI.

This document supersedes EN 13501-5:2005+A1:2009.

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of an identical text or by endorsement, at the latest by December 2016, and conflicting national standards shall be withdrawn at the latest by December 2016.

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

CEN, CENELEC and EOTA committees preparing technical specifications which contain performance requirements against external fire exposure of roofs should make reference to the classification given in this European Standard and not refer directly to any specific fire test method.

EN 13501 *Fire classification of construction products and building elements* consists of the following parts:

— *Part 1: Classification using data from reaction to fire tests*

— *Part 2: Classification using data from fire resistance tests, excluding ventilation services*

— *Part 3: Classification using data from fire resistance tests on components of normal building service installations: fire resisting ducts and fire dampers*

— *Part 4: Classification using data from fire resistance tests on components of smoke control systems*

— *Part 5: Classification using data from external fire exposure to roof tests*

— *Part 6: Classification using data from reaction to fire tests on electric cables*

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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Introduction

The aim of this European Standard is to define a harmonized procedure for the classification of roofs/roof coverings exposed to external fire. This classification is based on the test methods listed in Clause 5 and the relevant field of application procedures.

This European Standard has been prepared in support of the second essential requirement in the European Commission (EC) Construction Products Regulation (No 305/2011) and as detailed in the Interpretative document number 2: Safety in case of fire (OJ C62 Vol. 37).

The EC has drawn up a list of products which under specified conditions, may be considered to be Class B_{ROOF} without testing. This information is given in the Commission Decision of 2000-09-06 establishing the list of products belonging to Classes B_{ROOF} (Decision 2000/553/EC – 2005/403/EC – 2006/600/EC).

Additionally there is a procedure by which certain products can be assigned a particular fire classification without the need for testing. Such products have well-established reactions to fire performance and have been agreed by the Standing Committee on Construction. Agreements relating to such products which may be 'classified without further testing' (CWFT) are published in the Official Journal of the EU.

NOTE Test reports constitute the basis for extended application reports as explained in EN 15725.

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1 Scope

This European Standard provides the fire performance classification procedures for roofs/roof coverings exposed to external fire based on the four test methods given in CEN/TS 1187:2012 and the relevant extended application rules.

For the classification of a roof/roof covering, only those test methods and those application rules need to be applied for which the corresponding classification is envisaged.

Products are considered in relation to their end use application.

NOTE The distinction between roofs with a steep slope and facades, in terms of the test and classification standard to be applied, may be subject to national regulations.

General information on the four test methods in CEN/TS 1187 is given in Annex A.

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2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

CEN/TS 1187:2012, *Test methods for external fire exposure to roofs*

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

EN 15725, *Extended application reports on the fire performance of construction products and building elements*

EN ISO 13943:2010, *Fire safety - Vocabulary (ISO 13943:2008)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 13943:2010 and CEN/TS 1187:2012 and the following apply.

3.1
external fire spread time
T_E
time for external fire spread to the edge of the measuring zone (for test 3)

3.2
time to fire penetration
T_p
time for fire penetration as defined in 3. 5

3.3
non-combustible substrate or deck
substrate or deck classified A1 or A2-s1,d0 according to EN 13501-1 (for the purpose of this European Standard only)

3.4
combustible substrate or deck
substrate or deck not satisfying the definition of 'non-combustible product' in 3.3

3.5
penetration by fire
appearance on the underside of the specimen of any flaming or glowing other than that of the test flame, disregarding any test flame appearing through pre-existing openings in the test specimen (for test 4)

3.6
direct field of application
outcome of a process (involving the application of defined rules) whereby a test result is deemed to be equally valid for variations in one or more of the product properties and/or intended end use applications

3.7
extended field of application
outcome of a process (involving the application of defined rules that may incorporate calculation procedures) that predicts, for a variation of a product property and/or its intended end use application(s), a test result on the basis of one or more test results to the same test standard

3.8
extended application result
predicted result for performance parameter obtained following the process of extended field of application

3.9
extended application report
document reporting extended application results, including all details of the process leading to those results, prepared in accordance with EN 15725

4 Classes of external fire performance of roofs/roof coverings

The classification set out in this European Standard is based upon the test methods contained in CEN/TS 1187. That standard incorporates four distinct test methods that correspond to different fire hazard scenarios. There is no direct correlation between the test methods and hence no generally acceptable hierarchy of classification between them.

Products classified in a given class are deemed to satisfy all the requirements of any lower class for the same test method/fire hazard scenario. The classes with their corresponding fire performance are given in Table 1.

5 Test methods

5.1 General

The four test methods given in CEN/TS 1187 are those to be used for classification purposes for roofs/roof coverings. The selection of the tests to be carried out is specified in 6.3. The classification parameters, the classes and the corresponding criteria are specified in Clauses 8 and 9.

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5.2 Test 1: Method with burning brands

The test evaluates the performance of a roof under the conditions of thermal attack with burning brands. The performance includes the fire spread across the external surface of the roof, the fire spread within the roof and the fire penetration.

5.3 Test 2: Method with burning brands and wind

The test evaluates the performance of a roof covering under the conditions of thermal attack with burning brands and additional wind. The performance includes damaged length both on the roof covering and in the substrate.

5.4 Test 3: Method with burning brands, wind and supplementary radiant heat

The test evaluates the performance of a roof under the conditions of thermal attack with burning brands, additional wind and radiant heat. The performance includes the external fire spread and the fire penetration.

5.5 Test 4: Two-stage method incorporating burning brands, wind and supplementary radiant heat

The test evaluates the performance of a roof under the conditions of thermal attack with burning brands, wind and radiant heat. The performance includes the external fire spread and the penetration by fire.

6 Principles for specimen preparation, testing and classification

6.1 General requirements for specimen preparation

In general, this paragraph covers tests 1, 3 and 4.

Before testing, the test specimens shall be prepared and conditioned and, where relevant, mounted in accordance with the relevant test method and product standards or other technical specifications.

The external fire performance of a roof/roof covering includes such aspects as external and internal fire spread, external and internal damage, fire penetration and the occurrence of flaming droplets or debris. The external fire performance of a roof/roof covering therefore does not only depend on the burning behaviour of the exposed surface, the roof covering, but also on the influences of several components of the roof, such as the nature and thickness of insulating layers and vapour barriers together with their supporting elements. It may also depend on the systems of attachment of all components, e.g. glued or mechanically fastened.

Therefore, the test specimens shall be representative, in all details of practical application with regard to:

a) substrate and deck;

b) type, the number and the joining of all layers of roofing materials (including any insulation, vapour barriers, etc.); and

c) fixing of the layers.

In order to reduce the amount of testing, individual test methods specify standard specimen arrangements, covering a wider field of application.

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Such standard specifications concern the supporting decks and substrates, and the types and positioning of joints.

6.2 General requirements for testing

The external fire performance of a roof/roof covering does not only depend on the intrinsic properties of its components and the fire attack conditions, but also to a large extent on the pitch of the roof.

In order to reduce the amount of testing, some standard pitches are defined, covering a wider field of application. However, in tests 1 and 3 a sponsor may choose none of the standard pitches, although this will limit the field of application of the classification to the pitch used for testing.

6.3 Selection of test methods

Four different test methods, representing four different scenarios, are specified in CEN/TS 1187. The methods assess the fire performance of roofs/roof coverings under the following conditions:

a) Test 1 assesses the performance of a roof under attack with burning brands;

b) Test 2 assesses the performance of a roof covering under attack with burning brands and wind;

c) Test 3 assesses the performance of a roof under attack with burning brands, wind and supplementary radiant heat;

d) Test 4 assesses the performance of a roof using a two stage test method incorporating burning brands, wind and supplementary radiant heat.

The choice of the test method(s) to be applied depends on the classification envisaged by the sponsor.

If only a classification B_{ROOF} (t1) is envisaged (see Table 1), only test 1 with burning brands is carried out.

If only a classification B_{ROOF} (t2) is envisaged (see Table 1), only test 2 with burning brands and wind is carried out.

If only a classification B_{ROOF} (t3) or C_{ROOF} (t3) or D_{ROOF} (t3) is envisaged (see Table 1), only test 3 with burning brands, wind and supplementary radiant heat is carried out.

If only a classification B_{ROOF}(t4) or C_{ROOF}(t4) or D_{ROOF}(t4) or E_{ROOF}(t4) is envisaged (see Table 1), only test 4: two stage test method incorporating burning brands, wind and supplementary radiant heat is carried out.

If more than one classification is required, all the corresponding tests are carried out, as there is no direct correlation between the test methods and hence, no generally accepted hierarchy of classification between them.

6.4 Field of application

The field of application can be specified using test reports and other relevant data, in accordance with the procedures specified in EN 15725, which describe the role of extended application in the classification process.

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6.5 Specific requirements

6.5.1 General

Each test specifies a series of standard specimen compositions and test conditions covering a wider field of direct application.

The number of specimens to be prepared as well as the number of tests to be carried out depends on the envisaged field of application of the classification.

Variables are the pitch of the roof, the deck and/or substrate applied for the test and the inclusion of joints.

6.5.2 Test 1

6.5.2.1 General

Tests to be carried out are chosen to cover the envisaged field of application. The field of direct application is specified in 6.5.2.5. The extended field of application is specified in the relevant extended application standard and in EN 15725.

6.5.2.2 Pitch

The standard test pitches are 15° and 45°. Tests may also be done at the actual intended pitch.

6.5.2.3 Nature of the deck

The standard supporting decks for tests are specified in CEN/TS 1187:

a) wood particle board deck, constructed from planks 250 mm wide × 16 mm thick, density (680 ± 50) kg/m^3 with plain edges and tightly but jointed so that gaps between planks do not exceed 0,5 mm;

b) deck from wood particle board planks as under a) with plain edges with gaps of (5,0 ± 0,5) mm;

c) deck of 10 mm thick reinforced calcium silicate board, dry density (680 ± 50) kg/m^3;

d) trapezoidal profiled steel deck;

e) without any continuous deck.

Tests may also be done with the actual intended deck. The classification so obtained is valid only for the deck tested.

Table B.1 indicates how the deck can be selected taking into account the envisaged field of application.

For each type of deck for which a classification is required, four test specimens are tested out of five types specified in 6.5.2.4 as shown in CEN/TS 1187:2012, Table 1.

6.5.2.4 Positioning of joints

To assess the influence of the joints on the performance of the roof, five standard specimen types are defined out of which four shall be tested, details of which are given in CEN/TS 1187.

For every test on a given roof, four specimens are tested.

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6.5.2.5 Direct field of application of test results

6.5.2.5.1 Pitch

Test results obtained at 15° apply to roofs with pitches < 20°.

Test results obtained at 45° apply to roofs with pitches ≥ 20°.

Test results obtained at a single specified pitch other than 15° or 45° apply to roofs for that pitch only.

6.5.2.5.2 Nature of the deck

Test with standard supporting decks

Test results obtained with standard supporting decks shall apply to all systems with the same components (including the thickness) installed in the same way, but with different decks as follows.

a) Test results obtained with a wood particle board deck with gaps between planks not exceeding 0,5 mm apply to:

— any wooden continuous deck with a minimum thickness of 16 mm and with gaps not exceeding 0,5 mm;

— any non-combustible continuous deck with a minimum thickness of 10 mm;

b) Test results obtained with a wood particle board deck with gaps of (5,0 ± 0,5) mm between planks, apply to:

— any wooden continuous deck;

— any non-combustible deck with gaps not exceeding 5 mm;

c) Test results obtained with a reinforced calcium silicate board apply to:

— any non-combustible continuous deck with a minimum thickness of 10 mm;

d) Test results obtained with a trapezoidal profiled steel deck apply to:

— any profiled and non-perforated steel deck;

— any non-combustible continuous deck with a minimum thickness of 10 mm;

e) Test results obtained without any continuous deck apply to systems without continuous deck only.

Test with alternative supporting deck

Test results obtained with an alternative supporting deck apply only to that roof system (i.e. the constitution, materials, dimensions of components, thickness are identical).

6.5.2.6 Field of extended application

Extended application rules are detailed in the relevant extended application standard and in EN 15725.

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6.5.3 Test 2

6.5.3.1 General

Tests to be carried out are chosen to cover the envisaged field of application. The field of direct application is specified in 6.5.3.4. The extended field of application is specified in the relevant extended application standard and in EN 15725.

6.5.3.2 Pitch

The standard test pitch is 30°.

6.5.3.3 Nature and selection of the substrate

The standard substrates are:

a) wood particle board (not fire retardant treated), density (680 ± 50) kg/m^3, (19 ± 2) mm thick;

b) expanded polystyrene (EPS) (not fire retardant treated), density (20 ± 5) kg/m^3, (50 ± 10) mm thick;

c) fibre reinforced calcium silicate board, density (680 ± 50) kg/m^3, (10 ± 2) mm thick;

d) mineral wool, density (150 ± 20) kg/m^3, (50 ± 10) mm thick.

Table B.2 indicates how the substrate can be selected taking into account the envisaged direct field of application. Tests may be carried out using the end use substrate but in this case the test result obtained is applicable for this end use only.

6.5.3.4 Direct field of application of test results

a) Test results obtained with a pitch of 30° are valid for all pitches.

b) Test results obtained for a roof covering attached to a substrate apply only for the roof covering on substrates having a density greater than or equal to 0,75 times the density used in the test.

c) Test results obtained on a non-combustible standard substrate apply only for non-combustible substrates which also comply with 6.5.3.4 b).

d) Test results obtained on a combustible standard substrate apply to combustible and non-combustible substrates which also comply with 6.5.3.4 b).

e) Test results obtained on a non-standard substrate apply only to that substrate which also complies with 6.5.3.4 b).

6.5.3.5 Field of extended application

Extended application rules are detailed in the relevant extended application standard and in EN 15725.

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6.5.4 Test 3

6.5.4.1 General

Tests to be carried out are chosen to cover the envisaged field of application. The field of direct application is specified in 6.5.4.4. The extended field of application is specified in the relevant extended application standard and in EN 15725.

6.5.4.2 Pitch

The standard test pitches are 5° and 30°. Tests may also be done at the actual intended pitch. The classification so obtained is valid for that pitch only.

6.5.4.3 Nature of the deck

The standard decks are:

a) wood particle board deck, constructed from planks 250 mm wide × 16 mm thick having a density of (680 ± 50) kg/m^3 with plain edges and tightly but jointed so that gaps between planks do not exceed 0,5 mm;

b) deck from wood particle board planks as under a) with plain edges with gaps of (5 ± 0,5) mm;

c) deck of (12 ± 2) mm thick reinforced calcium silicate board of dry density (680 ± 50) kg/m^3;

d) trapezoidal profiled steel deck;

e) without any continuous deck.

Tests may also be done with the actual intended deck. The classification so obtained is valid only for the deck tested.

Table B.3 indicates how the deck can be selected taking into account the envisaged direct field of application.

6.5.4.4 Direct field of application of test result

6.5.4.4.1 Pitch

Test results obtained at 5° apply to roofs with pitches < 10°.

Test results obtained at 30° apply to roofs with pitches ≥ 10° and ≤ 70°.

Test results obtained at an alternative specified pitch apply to roofs for that pitch only.

6.5.4.4.2 Nature of the deck

Test with standard supporting decks

Test results obtained with standard supporting decks shall apply to all systems with the same components (including the thickness) installed in the same way, but with different decks as follows.

a) Test results obtained with a wood particle board deck with gaps between the planks not exceeding 0,5 mm, apply to:

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— any wooden continuous deck with a minimum thickness of 12 mm and with gaps not exceeding 0,5 mm;

— any non-combustible continuous deck with a minimum thickness of 10 mm without gaps.

b) Test results obtained with a wood particle board deck with gaps of (5,0 ± 0,5) mm between planks, apply to:

— any wooden continuous deck with a minimum thickness of 12 mm;

— any deck made from wooden planks with plain edges;

— any non-combustible deck with gaps not exceeding 5 mm.

c) Test results obtained with a reinforced calcium silicate board apply to:

— any non-combustible continuous deck with a minimum thickness of 10 mm.

d) Test results obtained with a trapezoidal profiled steel deck apply to:

— any profiled and non-perforated steel deck;

— any non-combustible continuous deck with a minimum thickness of 10 mm.

e) Test results obtained without any continuous deck apply to systems without continuous deck only.

6.5.4.5 Test with alternative supporting deck

Test results obtained with an alternative supporting deck apply only to that roof system (e.g. the constitution, materials, dimensions of components and thickness are identical).

6.5.4.6 Field of extended application

Extended application rules are detailed in the relevant extended application standard and in EN 15725.

6.5.5 Test 4

6.5.5.1 General

Tests to be carried out are chosen to cover the envisaged field of application. The field of direct application is specified in 6.5.5.5. The extended field of application is specified in the relevant extended application standard and in EN 15725.

6.5.5.2 Pitch

The standard test pitch is 45°, except where the specimens represent flat roofs (with a pitch up to 10°) and shall be tested horizontally. Tests may also be undertaken at the intended pitch. The classification obtained is valid for that pitch only.

6.5.5.3 Nature of deck

The tests shall be carried out on a specimen of complete roof structure representative of the complete end use roof construction, incorporating the actual intended deck and supporting structure.

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6.5.5.4 Inclusion of joints

At least one of the test specimens used for the penetration test shall include at least one example of a joint in each layer of the roof system to be tested.

6.5.5.5 Direct field of application of test results

6.5.5.5.1 Pitch

a) Test results obtained with a pitch of 0° (horizontal) are valid for flat roofs (with a pitch up to 10°).

b) Test results obtained with a pitch of 45° are valid for roofs with pitches greater than 10°.

c) Test results obtained at an alternative specified pitch apply to roofs for that pitch only.

6.5.5.5.2 Nature of the deck and supporting structure

The classification is valid only for the deck and supporting structure tested.

6.5.5.6 Field of extended application

Extended application rules are detailed in the relevant extended application standard and in EN 15725.

7 Number of tests for classification

The minimum number of tests for a given test pitch and a given deck/substrate is specified in the appropriate test method as follows:

Test 1: four test specimens are tested out on a variety of combinations of joints in the weathering and insulation layers.

Test 2: three test specimens are tested at a wind speed of 2 m/s and three specimens at a wind speed of 4 m/s.

Test 3: two test specimens are tested.

Test 4: one test specimen is tested in the preliminary test (Stage 1). Three test specimens are tested in the penetration test with at least one specimen containing examples of the joint details in each layer of the roof system.

8 Classification parameters

8.1 General

The classification parameters are specifics for each test and they are listed in the following subclauses.

8.2 Test 1

External and internal fire spread upwards.

External and internal fire spread downwards.

Maximum burned length external and internal.

Occurrence of burning droplets or debris falling from exposed side.

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Burning/glowing combustion particles penetrating the roof construction.

Occurrence and area of through openings (measured on the underside of specimen).

Lateral fire spread.

Internal glowing combustion.

Maximum radius of fire spread (horizontal roofs).

8.3 Test 2

Mean damaged length of the roof covering and substrate.

Maximum damaged length of the roof covering and substrate.

8.4 Test 3

External fire spread time T_E.

Time to fire penetration T_P.

8.5 Test 4

Preliminary ignition test with burning brands (Stage 1):

— duration of flaming;

— extent of flame spread;

— time to and nature of penetration.

Penetration test with burning brands, wind and supplementary radiant heat (Stage 2):

— time to penetration by fire;

— occurrence of melting and production of molten droplets or debris (flaming or non-flaming);

— time of mechanical failure or development of holes without penetration by fire.

9 Classes and criteria

Test 1 leads to the classification X_{ROOF} (t1).

Test 2 leads to the classification X_{ROOF} (t2).

Test 3 leads to the classification X_{ROOF} (t3).

Test 4 leads to the classification X_{ROOF} (t4).

The classes of external fire performance for roofs/roof coverings are specified in Table 1.

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Table 1 — Classes of external fire performance for roofs/roof coverings

Test method	Class	Classification criteria
CEN/TS 1187 Test 1	B_{ROOF} (t1)	All of the following conditions shall be satisfied for any one test: — external and internal fire spread upwards < 0,700 m; — external and internal fire spread downwards < 0,600 m; — maximum burned length external and internal < 0,800 m; — no burning material (droplets or debris) falling from exposed side; — no burning/glowing particles penetrating the roof construction; — no single through opening > 25 mm^2; — sum of all through openings < 4500 mm^2; — lateral fire spread does not reach the edges of the measuring zone; — no internal glowing combustion; — maximum radius of fire spread on 'horizontal' roofs, external and internal < 0,200 m.
	F_{ROOF} (t1)	No performance determined.
CEN/TS 1187 Test 2	B_{ROOF} (t2)	For both test series at 2 m/s and 4 m/s wind speed: — mean damaged length of the roof covering and substrate $\leq$ 0,550 m; — max damaged length of the roof covering and substrate $\leq$ 0,800 m.
	F_{ROOF} (t2)	No performance determined.
CEN/TS 1187 Test 3	B_{ROOF} (t3)	$T_E \geq 30$ min and $T_P \geq 30$ min.
	C_{ROOF} (t3)	$T_E \geq 10$ min and $T_P \geq 15$ min.
	D_{ROOF} (t3)	$T_P > 5$ min.
	F_{ROOF} (t3)	No performance determined.
CEN/TS 1187 Test 4	B_{ROOF}(t4)	— No penetration of roof system within 1 h. — In preliminary test, after withdrawal of the test flame, specimens burn for < 5 min. — In preliminary test, flame spread < 0,38 m across region of burning.
	C_{ROOF}(t4)	— No penetration of roof system within 30 min. — In preliminary test, after withdrawal of the test flame, specimens burn for < 5 min. — In preliminary test, flame spread < 0,38 m across region of burning.
	D_{ROOF}(t4)	— Roof system is penetrated within 30 min but is not penetrated in the preliminary test. — In preliminary test, after withdrawal of the test flame, specimens burn for < 5 min. — In preliminary test, flame spread < 0,38 m across region of burning.
	E_{ROOF}(t4)	— Roof system is penetrated within 30 min but is not penetrated in the preliminary test. — Flame spread is not controlled.
	F_{ROOF}(t4)	— No performance determined.

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10 Classification report

10.1 General

The aim of the classification report is to provide a harmonized way of presenting the classification of a roof/roof covering, based on results obtained during tests in accordance with CEN/TS 1187 and/or through extended application process.

A classification report provides detail on the basis and the results of the classification process.

10.2 Content and format

The classification report shall have the following content and format (see Annex B):

a) Identification number and date of the classification report;

b) Identification of the owner of the classification report;

c) Identification of the organization issuing the classification report;

d) Details of the nature of all products included in the roof under classification, including their commercial name(s);

e) Detailed description of the roof covering:

Either reference is made to a detailed description of the roof/roof covering as available in one of the test reports and/or the extended application report(s) in support of this classification, or a detailed description is reproduced in this classification report. The detailed description shall include a full description and identification of all relevant components and the method of assembly etc. If generic products are used, a general description is sufficient. If special products are used, however, e.g. fire retardant glues, all commercial references shall be given.

It shall also include reference(s) to all relevant product specifications applicable to the whole or parts of the classified roof/roof covering;

f) Test(s) and extended application(s) carried out:

   1) Each test report and extended application report used in support of this classification is identified by:

   — name of the laboratory carrying out the tests and/or preparing the extended application report;

   — name of the sponsor;

   — test report and/or extended application report identification number;

   2) Identification of the tests carried out in accordance with the standard and the envisaged field of application;

   3) For each specimen tested, test results relevant for the classification;

g) classification and field of application:

   1) Reference to the relevant classification procedure in this European Standard;

   2) Classification of the roof/roof covering;

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3) Detailed description of the field of application, i.e. the range of pitches, the nature of supporting decks/substrates;

h) Additional statements.

The classification report shall include:

i) any restrictions on the duration of the validity of this classification report;

ii) warning 'This European Standard does not represent type approval or certification of the product'.

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Annex A
(informative)

General information on the four test methods in CEN/TS 1187

All four test methods have been included in CEN/TS 1187: following acceptance within the EC Fire Regulators' Group and the Standing Committee for Construction that it was not possible at this stage to reach agreement on a single test method. The principal test conditions are:

— Test 1 – with burning brands;

— Test 2 – with burning brands and wind;

— Test 3 – with burning brands, wind and supplementary radiant heat;

— Test 4 – a two-stage test method incorporating burning brands, wind and supplementary radiant heat.

The tests assess the fire spread across the external surface of the roof, the fire spread within the roof, the fire penetration (tests 1, 3 and 4) and the production of flaming droplets or debris falling from the underside of the roof or from the exposed surface (tests 1, 3 and 4).

Tests 2 and 3 are not applicable to geometrically irregular roofs or roof mounted appliances, e.g. ventilators and dome lights.

Tests 1, 3 and 4 are carried out on a roof construction, test 2 is done on a roof covering with its substrate.

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Annex B
(normative)

Classification report for roofs/roof coverings exposed to external fire

B.1 General layout

LOGO/Letterhead of organization

undertaking classification

EXTERNAL EXPOSURE TO FIRE CLASSIFICATION REPORT OF PRODUCT XYZ

IDENTIFICATION NUMBER OF THIS REPORT

on behalf of

OWNER OF CLASSIFICATION REPORT

Address 1

Address 2

Address 3

Address 4

B.2 Introduction

This classification report defines the classification assigned to roof/roof covering xyz in accordance with the procedures given in EN 13501-5:2016.

B.3 Description of the roof/roof covering

Either:

The roof/roof covering xyz is fully described in the test report(s) and/or the extended application report(s) in support of the classification listed in B.4.1.

or

The roof/roof covering xyz comprises:

Description of all components of the roof/roof covering including mounting and fixing elements in order to identify the product..

These products conform to the following European Standard(s), ETAs or other relevant product specifications:

list of relevant specification(s).

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B.4 Reports and results in support of this classification

B.4.1 Reports

Name of laboratory	Name of sponsor	Report ref. no.	Test method and date/field of application rules and date

B.4.2 Test results

B.4.2.1 Test 1

Test conditions:

Test pitch: …

Supporting deck: …

Parameter	Criteria	Test results on specimen [b]				Compliance
		1	2	3	4	
Internal fire spread upwards	< 0,700 m					Y/N
External fire spread upwards	< 0,700 m					Y/N
Internal fire spread downwards	< 0,600 m					Y/N
External fire spread downwards	< 0,600 m					Y/N
Maximum burned length internal	< 0,800 m					Y/N
Maximum burned length external	< 0,800 m					Y/N
Burning, droplets/debris falling from exposed side	None					Y/N
Burning, glowing particles penetrating the roof	None					Y/N
Single through opening	< 25 mm^2					Y/N
Sum of all through openings	< 4500 mm^2					Y/N
Lateral fire spread	< edges [a]					Y/N
Internal glowing combustion	None					Y/N
Radius of fire spread (horizontal roof)	< 0,200 m					Y/N

[a] Edges of the measuring zone.

[b] Not for extended application.

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B.4.2.2 Test 2

Test conditions:

Test pitch: …

Substrate: …

Parameter	Criteria		Test results [a]					Compliance
	Mean	Max	Spe. 1	Spe. 2	Spe. 3	Mean	Max	
Damaged length at 2 m/s – roof covering	≤ 0,550 m	≤ 0,800 m						Y/N
Damaged length at 2 m/s – substrate	≤ 0,550 m	≤ 0,800 m						Y/N
Damaged length at 4 m/s – roof covering	≤ 0,550 m	≤ 0,800 m						Y/N
Damaged length at 4 m/s – substrate	≤ 0,550 m	≤ 0,800 m						Y/N
[a] Not for extended application.								

B.4.2.3 Test 3

Test conditions:

Test pitch: …

Supporting deck: …

Parameter	Criteria			Test results [a]		Compliance		
	Class B_{ROOF} (t3)	Class C_{ROOF} (t3)	Class D_{ROOF} (t3)	Spe. 1	Spe. 2	Class B_{ROOF} (t3)	Class C_{ROOF} (t3)	Class D_{ROOF} (t3)
External fire spread time T_E	≥ 30 min	≥ 10 min				Y/N	Y/N	Y/N
Time to fire penetration T_P	≥ 30 min	≥ 15 min	> 5 min			Y/N	Y/N	Y/N
[a] Not for extended application.								

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B.4.2.4 Test 4

Test conditions:

Test Pitch:…

Deck:…

Supporting structure:…

Preliminary test (Stage 1):

Parameter	**Criteria**				**Test results** [a]	**Compliance**			
	Class B_{ROOF}(t4)	**Class C_{ROOF}(t4)**	**Class D_{ROOF}(t4)**	**Class E_{ROOF}(t4)**	**Specimen 1**	**Class B_{ROOF}(t4)**	**Class C_{ROOF}(t4)**	**Class D_{ROOF}(t4)**	**Class E_{ROOF}(t4)**
Burn time	< 5 min	< 5 min	< 5 min	≥ 5 min		Y/N	Y/N	Y/N	Y/N
Flame spread distance	< 0,38 m	< 0,38 m	< 0,38 m	No limit		Y/N	Y/N	Y/N	Y/N
Penetration	None	None	None	None		Y/N	Y/N	Y/N	Y/N
[a] Not for extended application.									

Penetration test (Stage 2):

Parameter	**Criteria**				**Test results**				**Compliance**			
	Class B_{ROOF}(t4)	**Class C_{ROOF}(t4)**	**Class D_{ROOF}(t4)**	**Class E_{ROOF}(t4)**	**Specimen 1**	**Specimen 2**	**Specimen 3**	**Mean** [a]	**Class B_{ROOF}(t4)**	**Class C_{ROOF}(t4)**	**Class D_{ROOF}(t4)**	**Class E_{ROOF}(t4)**
Penetration time	≥ 60 min	< 60 min ≥ 30 min	< 30 min	< 30 min					Y/N	Y/N	Y/N	Y/N
[a] If one or two of the specimens have not failed at one hour, a time of 60 min shall be used in calculating the mean time of penetration.												

B.5 Classification and field of application

B.5.1 Reference

This classification has been carried out in accordance with EN 13501-5:2016.

B.5.2 Classification

The roof/roof covering xyz in relation to its external fire performance is classified:

B_{ROOF} (t1) or F_{ROOF} (t1)

and/or

B_{ROOF} (t2) or F_{ROOF} (t2)

and/or

B_{ROOF} (t3) or C_{ROOF} (t3) or D_{ROOF} (t3) or F_{ROOF} (t3)

and/or

B_{ROOF} (t4) or C_{ROOF} (t4) or D_{ROOF} (t4) or E_{ROOF} (t4) or F_{ROOF} (t4).

B.5.3 Field of application

This classification is valid for the following conditions:

1)	B_{ROOF} (t1) or F_{ROOF} (t1):	– range of pitches: …
		– range of decks: …
2)	B_{ROOF} (t2) or F_{ROOF} (t2):	– range of substrates: …
3)	B_{ROOF} (t3) or C_{ROOF} (t3) or D_{ROOF} (t3) or F_{ROOF} (t3):	– range of pitches: …
		– range of decks: …
4)	B_{ROOF} (t4) or C_{ROOF} (t4) or D_{ROOF} (t4) or E_{ROOF} (t4) or F_{ROOF} (t4)	– range of pitches: …
		– deck: …
		– supporting structure: …

B.6 Limitations

B.6.1 Restrictions

Statements concerning any restrictions on the duration of the validity of this classification report.

B.6.2 Warning

This European Standard does not represent type approval or certification of the product.

Report	Name	Signature [a]	Date
Prepared by			
Reviewed by			
[a] For and on behalf of 'Name of the organization'.			

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Table B.1 — Field of direct application of test results related to the choice of deck and pitch for test 1

FIELD OF APPLICATION		Choice of deck for test 1					
			Standard supporting deck				
		Actual intended deck	Deck a Wood particle boards 16 mm thick with gaps < 0,5 mm	Deck b Wood particle boards 16 mm thick with gaps of 5 mm	Deck c Continuous non combustible board of 10 mm thickness without gaps	Deck d Trapezoidal profiled steel deck	Deck e Without any continuous deck
ACTUAL TESTED DECK		**x**					
NON PROFILED CONTINUOUS DECK	Wooden continuous deck (>= 16 mm) with gap not exceeding 0,5 mm		**x**	**x**			
	Wooden continuous deck with gap not exceeding 5 mm			**x**			
	Continuous non combustible board of minimum 10 mm thickness without gaps		**x**	**x**	**x**	**x**	
	Non combustible board of minimum 10 mm thickness with gaps not exceeding 5 mm			**x**			
Trapezoidal profiled not perforated steel deck				**x**		**x**	
Roof without a continuous deck							**x**

Choice of pitch for test 1			
FIELD OF APPLICATION	**Pitch for test**		
	Single tested pitch other than 15° or 45°	15°	45°
Single tested pitch	**x**		
0° ≤ pitch < 20°		**x**	
20° ≤ pitch			**x**

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Table B.2 — Field of direct application of test results related to the choice of substrate and pitch for test 2

FIELD OF APPLICATION (*) All densities ≥ 0,75 x density of substrate tested	**Choice of substrate for test 2**				
		Standard substrate for test 2			
	Non standard substrate	Substrate A: Wood particle boards	Substrate B: expanded polystyrene	Substrate C: fibre reinforced calcium silicate board	Substrate dD mineral wool
Substrate tested (*)	**x**				
Combustible substrate (*)		**x**	**x**		
Non combustible substrate (*)		**x**	**x**	**x**	**x**

Choice of pitch for test 2	
FIELD OF APPLICATION	**Pitch for test**
	30°
All pitches	**x**

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Table B.3 — Field of direct application of test results related to the choice of deck and pitch for test 3

FIELD OF APPLICATION		Choice of deck for test 3						
			Standard supporting deck for test 3					
		Alternative supporting deck	Deck A Wood particle boards 16 mm thick with gaps not exceeding 0,5 mm	Deck B Wood particle boards 16 mm thick with gaps of 5 mm	Deck C Continuous non combustible board of 12 mm thickness	Deck D Trapezoidal steel deck	Deck E Without any continuous deck
ROOF SYSTEM TESTED		**x**					
NOT PROFILED CONTINOUS DECK	Wooden continuous deck (≥ 12 mm) with gap not exceeding 0,5 mm		**x**	**x**			
	Wooden continuous deck (> 12 mm) with gap not exceeding 5 mm			**x**			
	Continuous non combustible board of minimum 10 mm thickness without gaps		**x**	**x**	**x**	**x**	
	Non combustible board of minimum 10 mm thickness with gaps not exceeding 5 mm			**x**			
Trapezoidal non-perforated profiled steel deck						**x**	
Roof without a continuous deck							**x**

Choice of pitch for test 3			
FIELD OF APPLICATION	**Pitch for test**		
	Actual only single intended pitch	5°	30°
Actual only single intended pitch	**x**		
0° ≤ pitch < 10°		**x**	
10° ≤ pitch ≤ 70°			**x**

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Table B.4 — Field of direct application of test results related to the choice of deck, supporting structure and pitch for test 4

Field of application	**Choice of deck and supporting structure for test 4**
All roof systems	The classification is valid only for the deck and supporting structure as tested

Choice of pitch for test 4			
Field of application	**Pitch for test**		
	Single intended pitch	**0º**	**45º**
Single intended pitch	x		
0º ≤ pitch ≤ 10º		x	
10º < pitch ≤ 70º			x

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Bibliography

CEN/TS 16459:2013, *External fire exposure of roofs and roof coverings - Extended application of test results from CEN/TS 1187*

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