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Preskusi požarne odpornosti nenosilnih elementov - 6. del: Zapore votlih prostorov

Fire resistance tests for non-loadbearing elements - Part 6: Cavity barriers

Feuerwiderstandsprüfungen für nichttragende Bauteile - Teil 6: Hohlraum-Brandsperrern

Essais de résistance au feu des éléments non porteurs - Partie 6 : Dispositifs de recoupement de lame d'air

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Fire resistance tests for non-loadbearing elements - Part 6: Cavity barriers

Essais de résistance au feu des éléments non porteurs -
Partie 6 : Dispositifs de recouplement de lame d'air

Feuerwiderstandsprüfungen für nichttragende
Bauteile - Teil 6: Hohlraum-Brandsperren

This draft European Standard is submitted to CEN members for enquiry. 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.

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European foreword

This document (prEN 1364-6:2022) has been prepared by Technical Committee CEN/TC 127 “Fire safety in buildings”, the secretariat of which is held by BSI.

This document has been prepared by WG1 TG9, in response to CEN/TC 127 resolution No 778. CEN/TC 127 is the CEN committee for drafting fire test standards in support of the Construction Products Regulation.

The test method is needed in support of ETAG 026-5 for cavity barriers.

This document is currently submitted to the CEN Enquiry.

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

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Introduction

Cavity barriers are provided within buildings to restrict the spread of smoke and fire in concealed spaces. Cavity barriers can be 'closed' e.g. in roof voids, under raised floors, between the inner and outer leaves of walls such as in timber framed construction; or they can be 'open' e.g. as used in ventilated facade systems, roof eaves, rain screen cladding systems etc.

This document describes tests to measure the ability of a representative specimen of a cavity barrier to resist the spread of fire from one side to another. A representative sample of a cavity barrier is exposed to a specified regime of heating and pressure. The performance of the test specimen is monitored on the basis of criteria in EN 1363-1. The fire resistance of the tested construction is expressed as the time for which the appropriate criteria have been satisfied.

The principles embodied in this method follow those embodied in EOTA TR31 the fire resistance test for closed cavity barriers published in 2008. However, TR31 is not applicable to open cavity barriers and consequently this method has had to be adapted to include these.

Reference Scenario and limitations

Closed cavity barriers whose function is to close a gap between fire resistant elements of building structure fall within the scope of the small room fire scenario where ISO 834 has been recognized as the reference fire resistance test.

For open cavity barriers e.g. those used in ventilated facades, rain screens and roof eaves; a European reference scenario has not yet been established. Work is on-going to develop a full scale façade test and it is expected that this method will be correlated to that full scale test. Consequently, for the time being results of tests to this document cannot be used to imply performance of an external facade system in which the open cavity barrier is included. The test results can be used as supplementary evidence of cavity barrier performance in systems already accepted by current national regulations. Further information is given in Annex E.

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 may be evolved during the test. Mechanical and operation hazards can also arise during the construction of the test elements or structures, their testing and 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.

1 Scope

This test method specifies methods for determining the fire resistance of cavity barriers and is to be used in conjunction with EN 1363-1.

This document is applicable to non-loadbearing vertically or horizontally oriented closed and open cavity barriers, which are used to provide fire separation to uncomparted or ventilated spaces. Cavity barriers are designed to provide fire separating performance and the test method is therefore based on the standard room fire exposure in EN 1363-1. Open cavity barrier specimens are installed for test in one of two ways to simulate either normal or sudden exposure to fire in use.

Ventilating cavity barriers in facades, where the fire exposure comes as a result of a breaking window and allowing a developed fire to come into contact with the façade, shall be tested as prescribed in Annex D.

This document is not applicable to cavity barriers containing penetration seals, which shall be tested to EN 1366-3.

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

EN 1366-3, *Fire resistance tests for service installations — Part 3: Penetration seals*

EN 1366-6, *Fire resistance tests for service installations — Part 6: Raised access and hollow floors*

EN 13501-2:2016, *Fire classification of construction products and building elements - Part 2: Classification using data from fire resistance tests, excluding ventilation services*

EN ISO 13943, *Fire safety — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1363-1, EN ISO 13943 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at <https://www.electropedia.org/>

— ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1

concealed space

space in a building where fire may develop or pass through that is not normally used or accessible by humans

3.2

closed cavity barrier

non-loadbearing vertically or horizontally oriented element designed to provide fire separation in a concealed space (cavity)

Note 1 to entry: It will also limit airflow under ambient conditions.

prEN 1364-6:2022 (E)**3.3****splice**

connection or junction between or within the length of a linear gap seal where it is being used as a cavity barrier

3.4**'open' cavity barrier**

non-loadbearing vertically or horizontally oriented element designed to provide fire separation in a concealed space (cavity)

Note 1 to entry: These are open to allow ventilation and drainage in the cold state, but which either close in a fire, or are already fire resisting in the open state, thus providing fire separation in the cavity.

3.5**facade system**

system used to protect the outside vertical envelope of a building from the elements

3.6**air gap**

space between the back surface of the external wall panels and the outer face of the inner wall or insulation layer

3.7**sudden exposure to fire**

test conducted with a heat shield in place, so that removal after 5 minutes causes sudden exposure to fire as described in Annex D

4 Test equipment**4.1 Additional requirements for open cavity barriers**

In addition to the test equipment specified in EN 1363-1, it is required that for open cavity barriers the internal dimensions of the test furnace shall be such that a distance of at least 200 mm exists between the long edge of the open cavity barrier and the wall of the furnace.

The size of the furnace required will depend on the nominal width of the open cavity barrier and is given in Table 1 below. See also 6.2.

Table 1 — Minimum size of test furnace

Nominal width of open cavity barrier	Minimum size of furnace required
< 100 mm	1 m × 1 m × > 0,75 m deep
101 mm up to 300 mm	10 times nominal width of cavity barrier × > 0,75 m deep
> 300 mm	3 m × 3 m × > 0,75 m deep

See EN 1363-1, and if applicable EN 1363-2.

5 Test conditions

5.1 Heating conditions

The heating conditions and the furnace atmosphere shall conform to those given in EN 1363-1.

For open cavity barriers, an option is provided for the use of a removable shield underneath the cavity barrier which is removed at 5 min into the test suddenly exposing the cavity barrier to the furnace heating conditions at that time. See Annex D.

5.2 Pressure conditions

The pressure conditions and the furnace atmosphere shall conform to those given in EN 1363-1 unless modified as follows:

5.2.1 Cavity Barriers mounted within leaves of walls or in roof voids

For cavity barriers mounted between the leaves of walls and above suspended ceilings/in loft spaces, the pressure conditions and the furnace atmosphere shall conform to those given in EN 1363-1.

5.2.2 Cavity barriers mounted underneath raised access floors

For cavity barriers mounted underneath raised access floors, the following pressure conditions from EN 1366-6 shall apply:

For plenum heights not greater than 1 m, the pressure in the furnace 100 mm below the soffit shall be maintained at + 5 Pa (+ 3 Pa).

For plenum heights greater than 1 m, the pressure in the furnace 100 mm below the soffit shall be maintained at +3 Pa of a pressure calculated as per Formula (1) below:

$$p = 0,66h \times 8,5 \quad (1)$$

where

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- p is the pressure in Pa,
- h is the height of plenum below the raised floor in m.

5.2.3 Open cavity barriers

For open cavity barriers the furnace pressure shall be monitored and controlled so that 5 min after the commencement of the test, the furnace pressure shall be (20 ± 5) Pa at a position (100 ± 10) mm below the bottom face of the cavity barrier (horizontal orientation) or 100 mm below the top of the furnace (vertical orientation). Ten minutes after the commencement of the test, the furnace pressure shall be (20 ± 3) Pa. at a position (100 ± 10) mm below the bottom face of the open-state cavity barrier (horizontal orientation) or 100 mm below the top of the furnace (vertical orientation).

Laboratories should aim to achieve the specified pressures as soon as possible after commencement of the test. Furnaces should not be run under e.g. negative pressure for the first few minutes and then the pressure only established just before 5 min.

For open cavity barriers tested using the thermal exposure of the removable shield, the pressure conditions in 5.2.3 may not be met immediately after the removal of the shield. In such cases, any pressure drop should be corrected as quickly as possible and in any case within three minutes.

prEN 1364-6:2022 (E)**6 Test specimen****6.1 General**

The test specimen shall consist of a cavity barrier mounted in a supporting construction.

6.2 Size

If, in practice, the height or width of the product is 3 m or smaller, then that dimension of the test specimen shall be tested at full size. If any dimension of the construction is greater than 3 m, then that dimension shall be tested at not less than 3 m.

A typical minimum length to width ratio for an open cavity barrier is 10:1, up to a maximum of 3 m length. In order to maintain this ratio a test furnace of appropriate dimensions shall be used (see 4.2).

For open cavity barriers, the distance between the long edge open cavity barrier and the outer perimeter of the heated part of the separating element shall be not less than 200 mm at any point in order to avoid boundary effects (see 4.2).

6.3 Number

The number of test specimens shall be as given in EN 1363-1. Where a cavity barrier is intended for use in both horizontal and vertical separating elements, both orientations shall be tested.

6.4 Design**6.4.1 General**

The test specimen shall be fully representative of the construction used in practice. More than one type of cavity barrier system may be included in a single test provided the requirements on space separation (minimum 200 mm between any two specimens) and thermal and pressure conditions are met.

Joints or splices for the purposes of erection, construction or expansion, shall be incorporated in the test specimen. Different jointing systems or splices may be included in a single test specimen provided that they are both subjected to furnace pressure conditions equal to or greater than those specified in 5.2.

The design features which influence fire performance should be included to give the widest application can be derived from the field of direct application, Clause 13.

6.4.2 Test configuration

Five test configurations appropriate to the end uses of cavity barriers are considered in this document:

- a) above suspended ceilings and in lofts and other roof voids to prevent horizontal fire spread;
- b) below raised access floors between the underside of the raised floor and the upper side of the structural floor slab. Special considerations for testing these are given in Annex A;
- c) fire stopping between leaves of e.g. masonry walls to prevent vertical or horizontal fire spread between the leaves. Special considerations for testing these are given in Annex B;
- d) open cavity barriers installed as part of external walls, e.g. facades and roof eaves, etc. Special considerations for testing these are given in Annex C;
- e) open cavity barriers intended to resist severe exposure to fire, installed as part of external walls, e.g. facades and roof eaves, etc. Special considerations for testing are given in Annex D.