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Fire-resistance tests — Elements of building construction —

Part 8: Specific requirements for non-loadbearing vertical separating elements

Essais de résistance au feu — Éléments de construction —

Partie 8: Exigences spécifiques relatives aux éléments verticaux de séparation non porteurs

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 834 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 834-8 was prepared by Technical Committee ISO/TC 92, *Fire safety*, Subcommittee SC 2, *Fire containment*.

ISO 834 consists of the following parts, under the general title *Fire-resistance tests — Elements of building construction*:

— *Part 1: General requirements*

— *Part 3: Commentary on test method and test data application*

— *Part 4: Specific requirements for loadbearing vertical separating elements*

— *Part 5: Specific requirements for loadbearing horizontal separating elements*

— *Part 6: Specific requirements for beams*

— *Part 7: Specific requirements for columns*

— *Part 8: Specific requirements for non-loadbearing vertical separating elements*

— *Part 9: Specific requirements for non-loadbearing ceiling elements*

Annex A of this part of ISO 834 is for information only.

Introduction

This document contains specific requirements for fire resistance testing which are unique to the elements of building construction described as vertical separating non-loadbearing elements. The requirements for these non-loadbearing elements are intended to be applied in appropriate conjunction with the detailed and general requirements contained in Part 1 of this International Standard (ISO 834-1).

Fire-resistance tests — Elements of building construction —

Part 8:

Specific requirements for non-loadbearing vertical separating elements

CAUTION — The attention of all persons concerned with managing and carrying out this fire resistance test is drawn to the fact that fire testing may be hazardous and that there is a possibility that toxic and/or harmful smoke and gases may be evolved during the test. Mechanical and operational hazards may 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 shall be made and safety precautions shall be identified and provided. Written safety instructions shall be issued. Appropriate training shall be given to relevant personnel. Laboratory personnel shall ensure that they follow written safety instructions at all times.

1 Scope

This part of ISO 834 specifies the procedures to be followed for determining the fire resistance of non-loadbearing vertical separating elements when exposed to heating on one face.

The test is neither appropriate for the evaluation of curtain walls (non-loadbearing external walls suspended from the ends of floor slabs) nor for walls containing doors or glazing. For tests of walls containing doors refer to ISO 3008[2]. For tests of walls containing glazing refer to ISO 3009[3].

The application of this test to other untested forms of construction is acceptable when the construction complies with the direct field of application as given in this document or when it is subjected to a field of extended application analysis in accordance with ISO/TR 12470[4].

NOTE Since ISO/TR 12470 gives only general guidelines, specific extended application analyses are to be performed only by persons expert in fire resistant constructions.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 834. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 834 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 834-1, *Fire-resistance tests — Elements of building construction — Part 1: General requirements*

ISO 13943, *Fire safety — Vocabulary*

3 Terms and definitions

For the purposes of this part of ISO 834, the terms and definitions given in ISO 834-1, ISO 13943 and the following apply.

3.1
vertical separating elements
vertically oriented building elements, such as walls, which are required to act as fire separations or fire barriers, divide buildings into fire compartments or fire zones, or separate a building from adjoining buildings, in order to resist the spread of fire to or from adjoining compartments or buildings

3.2
non-loadbearing wall
separating element designed not to be subject to any load other than its own mass

3.3
insulated non-loadbearing wall
separating element, which satisfies both the integrity and insulation criteria for the fire resistance period

3.4
supporting construction
form of construction used to close off the furnace and to support the non-loadbearing wall being evaluated and which has known resistance to thermal distortion

3.5
plinth
form of supporting construction that reduces the height of the opening by raising the support base to accommodate the test specimen

3.6
uninsulated non-loadbearing wall
separating element which satisfies the integrity criteria for the fire resistance period, but which is not required to meet the thermal insulating criterion contained in ISO 834-1

4 Symbols and abbreviated terms

Symbols and designations appropriate to this test are given in ISO 834-1.

5 Test equipment

Equipment employed in the conduct of this test consists of a furnace, restraint and support frames and instrumentation as specified in ISO 834-1 and this part of ISO 834.

A test frame shall be provided, the rigidity of which shall be evaluated by applying an expansion force within the frame at midway between two opposite members of the frame, and measuring the increase in the internal dimensions at these positions. This evaluation shall be conducted in both directions of the frame and the increase of the internal dimension shall be measured.

The increase in the internal dimensions of the test frame shall not exceed 5 mm with an applied force of 25 kN.

6 Test conditions

The heating and pressure conditions and the furnace atmosphere shall conform to those given in ISO 834-1.

7 Test specimen preparation

7.1 Specimen design

7.1.1 General

The test specimen shall be either

a) fully representative of the construction intended for use in practice, including any surface finishes and fittings which are essential and may influence its behaviour in the test, or

b) be designed to obtain the widest applicability of the test result to other similar constructions.

The design features which influence fire performance that should be included to give the widest application can be derived from the field of direct application given in annex A.

The test specimen shall not contain mixtures of different types of construction, for instance brick or blocks in a wall unless this is fully representative of the construction in practice.

7.1.2 Services

When vertical separating elements incorporate services such as electrical junction boxes or surface finishes, which are an integral part of the design of the element, these shall be included in the test specimen.

7.2 Specimen size

If, in practice, the height or width of the construction 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 no less than 3 m.

7.3 Number of test specimens

For symmetrical constructions only one test specimen is required unless otherwise required by this part of ISO 834. For asymmetrical constructions the number of test specimens shall comply with the requirements given in ISO 834-1.

7.4 Specimen conditioning

At the time of the test the strength and moisture content of the test specimens shall approximate the conditions expected in normal service. This includes any infills and jointing materials. Guidance on conditioning is given in ISO 834-1. After equilibrium has been achieved the moisture content or state of cure shall be determined and recorded. Any supporting construction, including the lining to the test frame is exempt from this requirement.

7.5 Specimen installation and restraint

7.5.1 General

The test specimen and supporting construction (if used) shall be installed in the test frame as in practice.

The test specimen shall be mounted as near as possible to the exposed vertical plane of the test frame or supporting construction as appropriate.

The whole area of the test specimen shall be exposed to the heating conditions.

7.5.2 Supporting construction

If the size of the test specimen is smaller than the opening in the test frame, then it shall be installed in the test frame using the following approach.

a) Where the height of the test specimen is smaller than the height of the test frame opening, then a supporting construction shall be provided to reduce the opening to the required height. The supporting construction shall possess sufficient stability for the test specimen.

b) Where the width of the test specimen is smaller, a standard supporting construction shall be provided on the vertical sides and shall possess sufficient stability for the test specimen.

7.5.3 Restraint

When, in practice, the construction is not larger than the front opening of the furnace, then the edges of the test specimen shall be restrained as in practice. Where, in practice, the width of the construction is larger than the front opening of the furnace, one vertical edge shall be left unrestrained and there shall be a gap of 25 mm to 50 mm between the free edge of the test specimen and the test frame. This gap shall be packed with a resilient non-combustible material, for instance mineral fibre, to provide a seal without restricting freedom of movement. The remaining edges shall be restrained as in practice.

8 Application of instrumentation

8.1 Furnace thermocouples (plate thermometer)

8.1.1 Furnace interior

Plate thermometers shall be provided to measure the temperature of the furnace and shall be uniformly distributed to give a reliable indication of the temperature across the exposed face of the test specimen. These plate thermometers shall be constructed and located in accordance with ISO 834-1.

8.1.2 Number of furnace interior thermocouples

The number of plate thermometers shall not be fewer than one for every 1,5 m^2 of the exposed surface area of the test specimen. There shall be a minimum of four plate thermometers for any test and each shall be oriented so that side “A” faces the back wall of the furnace.

8.2 Unexposed surface thermocouples

Unexposed surface thermocouples shall be constructed and located in accordance with ISO 834-1. For determination of maximum temperature, thermocouples shall be applied to the unexposed face not closer than 100 mm to any edge, at the following locations, if appropriate:

a) at the head of the specimen at midwidth;

b) at the head of the specimen in line with a stud/mullion;

c) at the junction of a stud and a rail in a non-loadbearing wall system;

d) at midheight of the fixed edge;

e) at midheight of the free edge;

f) at midwidth, where possible, adjacent to a horizontal joint (positive pressure zone);

g) at midheight, where possible, adjacent to a vertical joint (positive pressure zone).

8.3 Deflection measurement

8.3.1 Instrumentation

Appropriate instrumentation shall be provided to determine a history of all significant deflection (i.e. greater than 5 mm) of the test specimen during the test.

8.3.2 Location

Measurements shall be made at the centre of the specimen and at midheight, 50 mm in from the free edge. The interval of measurement shall be adequate to present a history of movement during the test.

8.3.3 Guidance on application

Guidance on the application of deflection measurement is given in ISO 834-1.

NOTE Measurement of deflection is a mandatory requirement although there are no performance criteria associated with it. The deflection of the test specimen might be important in determining the extended field of application of the test result.

9 Test procedure

9.1 Furnace control

The furnace temperature and pressure conditions shall be measured and controlled in accordance with ISO 834-1.

9.2 Measurements and observations

The specimen shall be monitored for compliance with the criteria of integrity and insulation and required measurements and observations made in accordance with ISO 834-1.

10 Performance criteria

The fire resistance of non-loadbearing vertical separating elements shall be judged against the integrity and insulation criteria as specified in ISO 834-1.

11 Validity of the test

The test is valid when it has been conducted within all of the prescribed limits of the requirements pertaining to:

— the test equipment,

— test conditions,

— test specimen preparation,

— instrument application, and

— test procedure according to this part of ISO 834.

The test is also valid when the fire exposure conditions relating to furnace temperature, pressure and ambient temperature are in excess of the upper limits of the tolerances prescribed in this part of ISO 834 and ISO 834-1.

12 Expression of results

The results of the fire resistance test shall be expressed in accordance with ISO 834-1.

13 Test report

The report shall be in accordance with ISO 834-1.

Annex A
(informative)

Direct application of results

The results of a fire resistance test are applicable to similar untested non-loadbearing vertical elements provided that all the following are true.

a) The height is not increased.

b) The thickness is not reduced.

c) The edge conditions are unchanged.

d) Characteristic strength and density of any materials are unchanged.

e) Thermal insulation is not reduced at any point.

f) There is no change in the design of the cross-section (e.g. location of reinforcing bars).

g) The size of the openings is not increased.

h) The method of protecting the opening (e.g. glazing, door, sealing systems) is not changed.

i) The position of any opening is unchanged.

Bibliography

[1] ISO/TR 834-3, *Fire-resistance tests — Elements of building construction — Part 3: Commentary on test method and test data application*

[2] ISO 3008, *Fire-resistance tests — Door and shutter assemblies*

[3] ISO 3009, *Fire-resistance tests — Glazed elements*

[4] ISO/TR 12470, *Fire resistance tests — Guidance on the application and extension of results*

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