
**Fire-resistance tests — Elements
of building construction —**

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

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Essais de résistance au feu — Éléments de construction —

*Partie 4: Exigences spécifiques relatives aux éléments porteurs verticaux
de séparation*

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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 834-4 was prepared by Technical Committee ISO/TC 92, *Fire safety*, Subcommittee SC 2, *Fire resistance*.

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 horizontal separating elements*
- Part 10: *Method to determine the contribution of applied protection materials to structural metallic elements*
- Part 11: *Method to assess the contribution of applied protection materials to structural metallic elements*

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

Introduction

This part of ISO 834 contains specific requirements for fire-resistance testing which are unique to the elements of building construction described as vertical separating loadbearing elements. The requirements for these load-bearing elements are intended to be applied in appropriate conjunction with the detailed and general requirements contained in ISO 834-1.

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Fire-resistance tests — Elements of building construction —

Part 4:

Specific requirements for loadbearing vertical separating elements

1 Scope

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

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 part of ISO 834 or when subjected to an extended application analysis in accordance with ISO/TR 12470. 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 834-1:1999, *Fire-resistance tests — Elements of building construction — Part 1: General requirements*.

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

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

ISO/IEC 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

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

3.2

wall

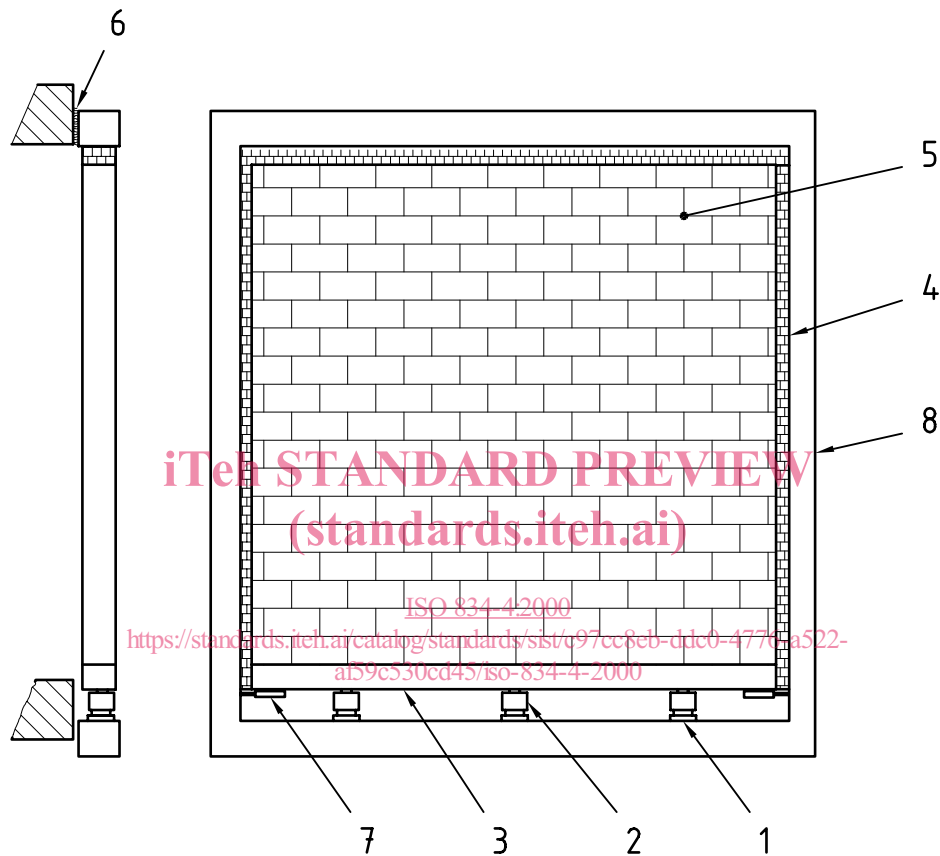
vertical separating element of a building construction which is loadbearing

4 Symbols and abbreviated terms

Refer to ISO 834-1 for symbols and abbreviated terms appropriate for this test.

5 Test equipment

Equipment employed in the conduct of this test consists of a furnace, loading equipment, restraint and support frames and instrumentation as specified in ISO 834-1. An example of the test equipment is illustrated in Figure 1.



Key

- | | |
|--------------------------|---------------------|
| 1 Hydraulic ram | 5 Test specimen |
| 2 Load cell | 6 Fibre insulation |
| 3 Load-distribution beam | 7 Linear transducer |
| 4 Bedding material | 8 Test frame |

Figure 1 — Example of set-up for loaded vertical assembly test

6 Test conditions

6.1 General

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

6.2 Restraint and boundary conditions

Restraint and boundary conditions shall comply with the requirements given in ISO 834-1 and the requirements of this part of ISO 834.

6.3 Loading

6.3.1 All loadbearing vertical separating elements shall be tested when subjected to loads, calculated in accordance with subclause 6.3 a), b) or c) of ISO 834-1:1999, in consultation with the sponsor to produce the conditions the structure is designed to accommodate. The material properties utilized in the calculation of the load shall be clearly indicated and their source given. For vertical separating elements which contain discreet loadbearing members, the load shall be proportional to the number of these members.

6.3.2 When the height of the proposed test specimen is greater than can be accommodated in the test furnace, the load shall be adjusted to be compatible with the slenderness ratio of the loadbearing elements of the specimen being tested, so that the load level of the full size construction is provided.

6.3.3 Vertical load shall be applied to either the top or bottom edge. Any unrestrained edges shall be sealed with non-restraining and non-combustible material.

6.3.4 The load shall be applied either uniformly along the whole width of the specimen by a loading beam or by individual loading jacks at selected points, when this is more representative of the use of the construction. When the test specimen is designed to be eccentrically loaded, or when only one leaf of a cavity construction is to be loaded, these conditions shall be reproduced in the specimen.

6.3.5 When uniformly loaded, the test specimen shall be erected within a loading frame having appropriate stiffness in relation to the test construction and to the loads which will be imposed upon it during the test. As a guide, the load distribution members should not deflect more than 1 mm under a force of 10 kN applied at the centre span, in the plane of the frame.

6.3.6 The loading system shall be capable of compensating for the maximum allowable deformation of the specimen.

6.3.7 Where both leaves of a double leaf wall are to be loaded, provisions shall be made to load each leaf independently. The loading equipment shall be able to apply a load of different magnitude to one leaf from the other when this is appropriate.

7 Test specimen preparation

7.1 Specimen design

The test specimen shall be designed to characterize the many aspects of the construction for which the desired rating is sought.

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

The specimen size shall be full size when the construction in practice is less than 3 m high or 3 m wide. For elements that are larger than that which can be accommodated in at least a 3 m × 3 m furnace, the minimum specimen size exposed to the heating shall not be less than 3 m × 3 m.