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First edition
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Fire-resistance tests — Elements of building construction —

Part 1: General requirements

Essai de résistance au feu — Éléments de construction

Partie 1: Exigences générales



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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as International Standard requires approval by at least two-thirds of the Member Bodies casting a vote.

International Standard ISO 834-1 was prepared by Technical Committee ISO/TC 92, *Fire safety*, Subcommittee SC 2, *Fire resistance*.

This first edition of ISO 834-1 cancels and replaces ISO 834:1975, together with Amendment 1:1979 and Amendment 2:1980, of which it constitutes a technical revision. The revision has been made because of the need for more accuracy and reproducibility in the test method. Its provisions are supplemented by the commentary material contained in part 3.

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 loadbearing beams*
- *Part 7: Specific requirements for loadbearing 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*

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Introduction

Significant changes with respect to ISO 834:1975 are requirements for the following:

- accuracy of measuring equipment;
- tolerances applied to the deviation of the curve of the average furnace temperature with respect to the standard heating curve;
- pressure conditions for vertical and horizontal elements;
- specification of test load;
- conditioning;
- application of instrumentation;
- criteria respecting loadbearing capacity.

In general, the revision reflects the objective of Working Group WG 1 in providing a standard that is arranged in logical sequence and providing for increased precision in the development and application of the test data, as well as repeatability of the results using the same and different equipment. It is planned to enhance the repeatability aspect by the development, in the near future, of a precision calibration routine which will address parameters such as temperature uniformity, pressure gradients, oxygen concentration, furnace lining materials, and others.

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Fire-resistance tests – Elements of building construction –

Part 1:

General requirements

1 Scope

This part of ISO 834 specifies a test method for determining the fire resistance of various elements of construction when subjected to standard fire exposure conditions. The test data thus obtained will permit subsequent classification on the basis of the duration for which the performance of the tested elements under these conditions satisfies specified criteria.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 834. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 834 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 13943:—¹⁾, *Fire safety — Vocabulary*.

IEC 60584-1:1995, *Thermocouples — Part 1: Reference tables*.

3 Definitions

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

3.1 actual material properties: Properties of a material determined from representative samples taken from the specimen for the fire test according to the requirements of the concerned product standard.

3.2 calibration test: Procedure to assess the test conditions experimentally.

3.3 deformation: Any change in dimension or shape of an element of construction due to structural and/or thermal actions. This includes deflection, expansion or contraction of elements.

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roof, beam or column.

3.5 insulation: Ability of a separating element of building construction when exposed to fire on one side, to restrict the temperature rise of the unexposed face to below specified levels.

3.6 integrity: Ability of a separating element of building construction, when exposed to fire on one side, to prevent the passage through it of flames and hot gases or the occurrence of flames on the unexposed side.

3.7 loadbearing capacity: Ability of a specimen of a loadbearing element to support its test load, where appropriate, without exceeding specified criteria with respect to both the extent of, and rate of, deformation.

3.8 loadbearing element: An element that is intended for use in supporting an external load in a building and maintaining this support in the event of a fire.

3.9 neutral pressure plane: Elevation at which the pressure is equal inside and outside the furnace.

3.10 notional floor level: Assumed floor level relative to the position of the building element in service.

3.11 restraint: The constraint to expansion or rotation (induced by thermal and/or mechanical actions) afforded by the conditions at the ends, edges or supports of a test specimen.

NOTE — Examples of different types of restraint are longitudinal, rotational and lateral.

3.12 separating element: An element that is intended for use in maintaining separation between two adjacent areas of a building in the event of a fire.

3.13 supporting construction: That construction that may be required for the testing of some building elements into which the test specimen is assembled, such as the wall into which a door is fitted.

3.14 test construction: Complete assembly of the test specimen together with its supporting construction.

3.15 test specimen: Element (or part) of a building construction provided for the purpose of determining either its fire resistance or its contribution to the fire resistance of another building element.

4 Symbols

Symbol	Description	Unit
A	area under the actual average furnace time/temperature curve	$^{\circ}\text{C}\cdot\text{min}$
A_s	area under the standard time/temperature curve	$^{\circ}\text{C}\cdot\text{min}$
C	axial contraction measured from the start of heating	mm
$C(t)$	axial contraction at time t during the test	mm
$\frac{dC}{dt}$	rate of axial contraction, defined as: $\frac{C(t_2) - C(t_1)}{(t_2 - t_1)}$	mm/min