
Fire-resistance tests — Elements of building construction —

Part 9:

Specific requirements for non-loadbearing ceiling elements

iTeh STANDARD PREVIEW

Essais de résistance au feu — Éléments de construction —

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*Partie 9: Exigences spécifiques relatives aux éléments non porteurs de
plafond*

ISO 834-9:2003

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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 834-9 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 part of ISO 834 contains specific requirements for fire resistance testing which are unique to the elements of building construction described as 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 ISO 834-1.

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Fire-resistance tests — Elements of building construction —

Part 9:

Specific requirements for non-loadbearing ceiling 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 test procedures for determining the fire resistance of non-loadbearing ceiling elements which possess fire resistance independent of any building element above them, when exposed to heating from below the ceiling. It is applicable to self-supporting ceilings and to ceilings suspended from, or fixed directly to, a supporting construction.

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^[1]. Since ISO/TR 12470 gives only general guidelines, specific extended application analyses are to be performed only by persons expert in fire-resistant constructions.

This part of ISO 834 is not applicable to ceilings used as a horizontal fire barrier for the protection of a loadbearing element above, in which case performance is assessed as an integral part of the complete assembly using ISO 834-5.

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, definitions, symbols and abbreviations given in ISO 834-1, the terms and definitions given in ISO 13943 and the following apply.

3.1

ceiling

non-loadbearing element of building construction designed to provide horizontal fire separation

3.2

ceiling grid

substructure or suspension system that supports the ceiling membrane

3.3

expansion device

typically, device built into the ceiling grid that allows for expansion of the grid without causing significant deformation of the ceiling

3.4

plenum

concealed space between ceiling and floor or roof, often, but not necessarily, designed to accommodate air movement

3.5

self-supporting ceiling

ceiling with span from wall to wall, without additional suspension support

3.6

services

devices penetrating the ceiling (e.g. lighting and ventilation systems) not otherwise covered by a specific fire test

3.7

span

distance between centres of support

3.8

suspended ceiling

non-loadbearing horizontal protective membrane suspended from a loadbearing horizontal separating element and its supporting framework, including hangers, services, insulating materials, and access and inspection panels

3.9

test specimen

full ceiling specimen submitted for test, including hangers, fittings, insulating materials and features such as lighting, ventilation and access and inspection panels

4 Test equipment

The test equipment employed in the conduct of this test shall consist of a furnace, restraint and support frames and instrumentation in accordance with ISO 834-1.

5 Test conditions

The heating and pressure conditions, furnace atmosphere and the restraint and boundary conditions shall be in accordance with ISO 834-1, in addition to the requirements of this part of ISO 834.

6 Test specimen preparation

6.1 Specimen design

6.1.1 Details of construction

The test specimen shall be designed to characterize the details of the construction for which the desired rating is sought, such as longitudinal and transverse jointing systems. Differently constituted forms of the same detail shall be avoided.

6.1.2 Alignment

When the longitudinal and transverse directions of the ceiling are constructed differently, and the performance of the test specimen varies depending upon the direction aligned with the longitudinal axis, the ceiling shall be designed to represent the more onerous orientation by arrangement of the more critical components parallel to the longitudinal axis. When the more onerous condition cannot be identified, two separate tests shall be performed, with the components arranged both parallel and perpendicular to the longitudinal axis.

6.1.3 Services

When ceilings incorporate services such as lighting or air handling systems, which are an integral part of the design of the ceiling, these shall be included in the test specimen or in an additional specimen and distributed as in practice.

6.2 Specimen size

The exposed dimensions of the test specimen shall be at least $4\text{ m} \times 3\text{ m}$, unless the construction it represents is designed to have exposed dimensions of less than $4\text{ m} \times 3\text{ m}$, in which case the actual exposed dimensions shall be tested. The span of the ceiling shall be in the direction of the larger dimension.

6.3 Number of test specimens

The number of test specimens shall be in accordance with this part of ISO 834 and ISO 834-1.

6.4 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 shall include any infills and jointing materials. All components and materials of the test specimen shall be conditioned in accordance with 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.

6.5 Specimen installation and restraint

6.5.1 General

6.5.1.1 Installation and fittings

The ceiling shall be installed in a manner representative of its use in practice. It shall be installed using the method and procedures recommended by the sponsor. It shall model the edges between the ceiling and walls, the joints and jointing materials to be used in practice. The test specimen shall include any appropriate fittings that are an essential part of the specimen and may influence its behaviour in test.