
Fire resistance tests —

**Part 3:
Door and shutter assemblies
horizontally oriented**

Essais de résistance au feu —

Partie 3: Assemblages de portes et volets orientés horizontalement

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: [Foreword — Supplementary information](http://Foreword—Supplementary information).

The committee responsible for this document is ISO/TC 92, *Fire safety*, Subcommittee SC 2, *Fire containment*.

ISO 3008 consists of the following parts, under the general title, *Fire resistance tests*:

- *Part 2: Lift landing door assemblies*
- *Part 3: Door and shutter assemblies horizontally oriented*

Introduction

This part of ISO 3008 specifies requirements for fire resistance testing which are unique to the elements of building construction described as horizontally oriented doors and shutters. The requirements for these doors and shutters are intended to be applied in conjunction with the appropriate detailed and general requirements contained in ISO 834-1 and ISO 3008.

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Fire resistance tests —

Part 3:

Door and shutter assemblies horizontally oriented

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 test elements or structures, their testing and disposal of test residues.

An assessment of all potential hazards and health risks shall be made by the laboratory 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 3008 specifies the test method for determining the fire resistance of horizontally oriented door and shutter assemblies which may be exposed to a fire from the underside. It is applicable to all types of door and shutter assemblies installed in a horizontal orientation within floor or roof assemblies requiring fire-resistance ratings in buildings.

The test method allows for the measurement of integrity and, if required, the measurement of radiation and thermal insulation. In addition, this test method includes measurement of the load-carrying ability of the test specimens subjected to a standard fire-resistance test.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 834-1:1999, *Fire-resistance tests — Elements of building construction — Part 1: General requirements*

ISO 834-5, *Fire-resistance tests — Elements of building construction — Part 5: Specific requirements for loadbearing horizontal separating elements*

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

ISO 3009, *Fire-resistance tests — Elements of building construction — Glazed elements*

ISO 13943, *Fire safety — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 834-1, ISO 3008, ISO 13943 and the following apply.

3.1

associated supporting construction

specific construction in which the door or shutter assembly is installed as intended for use in practice and which is used to close off the furnace and provide the levels of restraint and thermal heat transfer to be experienced in normal use

3.2

door assembly

combination of a door, a frame, hardware, closers, sealing materials and other accessories installed in a horizontal plane, which together provide a specific degree of fire-resistance to a through opening in a fire-resistance rated floor or roof

3.3

shutter assembly

complete assembly consisting of rolling, folded or sliding panels or slats including guides, rollers, tracks, other accessories, operating mechanism and housings intended for installation in a horizontal plane

3.4

standard supporting construction

form of construction used to close off the furnace and to support the door assembly being evaluated and has a quantifiable influence on both the thermal heat transfer between the construction and the test specimen and provides known resistance to thermal distortion

3.5

door length

direction of the door panel, door assembly or shutter which has the greatest dimension

3.6

door width

direction of the door panel, door assembly or shutter which has the shortest dimension

4 Test equipment

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4.1 The test equipment shall be as specified in ISO 834-1. The furnace used shall be related to the orientation of the test specimen. For horizontal specimens, the floor furnace is applicable.

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4.2 Measurement of heat flux from the unexposed surface of specimens shall be made as described in [9.4](#).

5 Test conditions

Test conditions require the application of the heating and pressure conditions of the standard test for a loadbearing horizontal separating element as defined in ISO 834-1.

6 Test specimen

6.1 Size of specimen

The test specimen and all its components shall be full size. When this is restricted by the size of the opening of the furnace (which is normally 3 m × 4 m), the door or shutter assembly shall be tested at the maximum size possible and the fire resistance of the full-sized assembly shall be derived by an extended application analysis. However, the minimum dimensions of the supporting construction shall not be less than that prescribed in [7.3.1](#).

6.2 Design of specimen

6.2.1 The design of the test specimen and the choice of supporting construction shall take into account the requirements of [7.3](#) if the widest field of direct application is to be achieved.

6.2.2 The test specimen shall be fully representative of the door or shutter assembly as intended for use in practice, including any appropriate surface finishes and fittings which are an essential part of the specimen and may influence its behaviour in a test construction.

6.2.3 If the test specimen is intended for use at an incline other than horizontal, the guidance for inclined specimens in ISO 3009 shall be followed.

6.3 Verification

6.3.1 The sponsor shall provide a specification to a level of detail sufficient to allow the laboratory to conduct a detailed examination of the specimen before the test and to agree on the accuracy of the information supplied. ISO 834-1 provides detailed guidance on verification of the test specimen.

6.3.2 When the method of construction precludes a detailed survey of the specimen without having to permanently damage it, or if it is considered that it will subsequently be impossible to evaluate construction details from a post-test examination, then one of two options shall be exercised by the laboratory, either:

- the laboratory oversees the manufacture of the door or shutter assembly(ies) that is to be the subject of the test; or
- the sponsor, at the discretion of the laboratory, be requested to supply an additional assembly or that part of the assembly which cannot be verified (e.g. a door leaf) in addition to the number required for the testing. The laboratory shall then choose freely which of these shall be subjected to the testing and which shall be used to verify the construction.

7 Installation of test specimen

7.1 General

7.1.1 The test specimen shall be installed in a manner as intended for use in practice, incorporating all hardware and other items, which may influence the performance of the specimen.

7.1.2 The test specimen shall be mounted in a supporting construction, the field of application of which covers the type (see 7.3.1) in which it is intended to be used. The design of the connection between the test specimen and the supporting construction, including any fixings and materials used to make the connection shall be as intended for use in practice and shall be regarded as part of the test specimen.

7.1.3 The whole area of the test specimen, together with at least the minimum dimensions of the supporting construction required by 7.3.1 shall be exposed to the heating conditions.

7.2 Supporting construction

The fire resistance of any supporting construction shall not be determined from a test in conjunction with a test specimen and shall be at least commensurate with that anticipated for the test specimen.

7.3 Test construction

7.3.1 Associated and supporting construction

The space between the specimen and the frame shall be filled with either

- associated construction, or
- supporting construction.

There shall be a minimum zone of supporting construction of 200 mm wide exposed within the furnace, each side and over the top of the aperture into which the test specimen is to be fixed. The thickness of the supporting construction may be increased outside of the 200-mm zone. The test construction

may incorporate more than one test specimen providing that there is minimum separation of 200 mm between each specimen and between the specimens and the edge of the furnace.

7.3.2 Associated construction

When the test specimen is always installed in a specific, normally proprietary, form of construction, that is permanently associated with its intended use in practice, then the specimen shall be installed in a sample of this supporting construction.

7.3.3 Supporting construction

7.3.3.1 Where the test specimen is not permanently associated with a specific form of construction, the area between the test specimen and the support frame shall be filled with a rigid or flexible standard supporting construction as specified in ISO 834-5.

7.3.3.2 The choice of standard supporting construction shall reflect the range of intended use for the door or shutter assembly. The rules governing the applicability of the chosen standard supporting construction to other end use situations are given in [Clause 13](#).

7.4 Gaps

7.4.1 The adjustment of the door leaf, leaves or shutter and gaps shall be within the tolerances of the design values stipulated by the sponsor. These shall be representative of those used as intended for use in practice so that appropriate clearances exist, e.g. between the fixed and moveable components.

7.4.2 In order to generate the widest field of direct application, the gaps shall be set between the middle value and the maximum value within the range of gaps given by the sponsor.

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8 Conditioning

8.1 Moisture content

The test specimen shall be conditioned in accordance with ISO 834-1. Requirements for conditioning of supporting constructions are given in [Annex A](#).

8.2 Mechanical

Some product standards exist for certification purposes that require mechanical testing before the start of the fire test. Durability requirements are given in the relevant product standard. When mechanical testing is required, the method used shall follow the requirements of the relevant product standard.

9 Application of instrumentation

9.1 Temperature measurements

9.1.1 Furnace temperature measuring instrument

Plate thermometers shall be provided in accordance with ISO 834-1. They shall be evenly distributed over a horizontal plane, 100 mm from the nearest plane of the test construction. There shall be at least one plate thermometer for every 1,5 m² of the exposed surface area of the test construction, subject to a minimum of four. The plate thermometer shall be oriented so that “side A” faces the back wall of the furnace.

9.1.2 Unexposed face thermocouples

9.1.2.1 Where no evaluation against the insulation criteria is required of the door or shutter assembly, or any part thereof, no temperature measurements are required.

9.1.2.2 Where compliance with the insulation criteria is required to be evaluated, thermocouples of the type specified in ISO 834-1 shall be attached to the unexposed face for the purpose of obtaining the average and maximum surface temperatures.

9.1.2.3 The temperature of the supporting construction in which the door or shutter assembly is mounted is not required to be measured and therefore, no thermocouples are required.

9.1.2.4 No thermocouple shall be placed within 50 mm of any hardware.

9.1.2.5 Position five thermocouples (for single or double leaf doors), one at the centre of each specimen leaf (single or multiple) and one at the centre of each quarter section. These shall not be located closer than 50 mm to any joint, stiffener or through component, nor closer than 100 mm to the edge of the leaf.

9.1.2.6 For door or shutter assemblies which incorporate discrete areas of different thermal insulation $\geq 0,1 \text{ m}^2$ (e.g. glazed panels within a door leaf), extra thermocouples shall be evenly distributed over the sum of the surface of those areas to determine the average temperature at a density of one thermocouple per square metre or part thereof, subject to a minimum of two. The average insulation performance of the sum of each area shall be determined.

9.1.2.7 When the total area of a single portion of the door or shutter assembly represents less than $0,1 \text{ m}^2$, it shall be disregarded for the purpose of ascertaining the average unexposed face temperature.

9.1.2.8 Temperature of door leaf or shutter

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Thermocouples shall be fixed to the face of each leaf or shutter as follows:

- a) at mid-length, 100 mm in from the edges as specified below;
- b) at mid-width, 100 mm from the edge as specified below;
- c) 100 mm in from the edges as follows:
 - 1) the inside edges of the clear opening for shutters or sliding doors installed on the exposed side of the supporting construction;
 - 2) the visible part of the edge of the door leaf for
 - i) hinged or pivoted doors opening away from the furnace,
 - ii) shutters or sliding doors installed on the unexposed side of the supporting construction.

If due to the narrow width of the leaf (leaves) or shutter(s) the thermocouples specified in b) and c) are closer than 500 mm to each other, then those specified in b) are omitted.

If the leaf is $< 200 \text{ mm}$ wide (e.g. as in a multi-leaf folding shutter), then the leaves will be treated as if they were one leaf with respect to application of unexposed face thermocouples for evaluating maximum temperature rise.

Additional thermocouples shall be fixed to other areas of the leaf or shutter, e.g. over any through connection or position where the temperature might be expected to be higher than the mean for the surface, subject to the limitations given in 9.1.2.9.