
**Fire resistance tests — Door and shutter
assemblies**

Essais de résistance au feu — Assemblages porte et volet

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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 2.

The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 3008 was prepared by Technical Committee ISO/TC 92, *Fire safety*, Subcommittee SC 2, *Fire containment*.

This second edition cancels and replaces the first edition (ISO 3008:1976), the following clause and subclauses of which have been technically revised as described below.

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- a) The addition of some specific types of door and shutter assemblies such as elevator/lift landing doors in Clause 1.
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 - b) Specific guidance on the types of associated and supporting construction to test and their associated field of application in 7.3.1.2 and 7.3.1.3.
 - c) The addition of the plate thermometer for furnace temperature control in 9.1.1.
 - d) Greater detail on unexposed face temperature, pressure, and heat flux measurements in 9.1.2, 9.2, 9.3, 9.4 and 9.5.

Introduction

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

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Fire resistance tests — Door and shutter assemblies

WARNING — 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 emitted 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 International Standard specifies a method for determining the fire resistance of door and shutter assemblies designed primarily for installation within openings incorporated in vertical separating elements, such as:

- hinged and pivoted doors;
- horizontally-sliding and vertically-sliding doors including articulated sliding doors and sectional doors;
- steel single skin folding shutters (uninsulated);
- other sliding folding doors;
- tilting doors;
- lift landing/elevator doors;
- rolling shutter doors;
- removable panels in walls.

This International Standard is used in conjunction with ISO 834-1. No requirements are included for mechanical conditioning, e.g. “shakedown” or durability, as these are included in the relevant product standard. This method may also be used to determine the fire resistance of non-loadbearing horizontal doors by analogy. However, these are not specifically addressed here and the field of direct application given in Clause 13 is not valid for horizontally-oriented doors.

For smoke leakage testing of doors and shutters refer to ISO 5925-1.

2 Normative references

The following referenced documents are indispensable for the application of this document. 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 834-8:2002, *Fire-resistance tests — Elements of building construction — Part 8: Specific requirements for non-loadbearing vertical separating elements*

ISO 3009:2003, *Fire-resistance tests — Elements of building construction — Glazed elements*

ISO 5925-1, *Fire tests — Smoke control door and shutter assemblies — Part 1: Ambient and medium temperature leakage test procedure*

ISO 13943:2000, *Fire safety — Vocabulary*

3 Terms and definitions

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

3.1 associated supporting construction

specific construction in which the door or shutter assembly is to be 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 cill
member, which spans between two frame jambs at the base which may or may not be set into the floor and which remains visible

3.3 door assembly door set

assembly, complete with grilles and louvers together with the door hardware and any fire seals, smoke seals, draught seals, acoustic seals and consisting of pivoted, hinged or sliding door leaves or leaf, including any frame, which is provided for closing of permanent openings in separating elements

NOTE This includes all side-panels, vision panels or transom panels.

3.4 door hardware

items such as hinges, handles, locks, panic bars, escutcheons, letter plates, kick plates, sliding gear, closing devices, electrical components, wiring, etc. which are, or can be used in the door or shutter assembly

3.5 double action

action of a fire door leaf that opens in both directions

3.6 fire seal

seal fitted to the frame or to the leaf edge for the purpose of extending the period of integrity of the assembly

3.7**floor**

upper surface of the horizontal element on which the door or shutter assembly is mounted and which extends from the exposed face to the unexposed face of the assembly

3.8**flush over panel**

fixed panel fitted within the head and jambs above the door leaf without a transom fitted

3.9**gap**

clearance between two nominally adjacent surfaces and/or edges, e.g. between the edge of a leaf and the frame or face of the leaf and the frame stop

3.10**primary leaf**

leaf of a multi-leaved door assembly which is the largest and/or has the handle attached to it as the preferred leaf for general operation

NOTE If the leaves of a multi-leaved door are the same size and if the handles (or other hardware such as push plates) are fitted to all leaves, then no primary leaf exists for that door assembly.

3.11**shutter assembly**

complete assembly consisting of rolling, folded or sliding curtains including guides, rollers, tracks, and operating mechanism and housings

3.12**side panel**

fixed panel which is incorporated to one side of a door which is part of the test specimen

3.13**single action**

action of a fire door leaf that opens in only one direction

3.14**smoke seal**

seal fitted to the frame or to the leaf edge for the purpose of restricting the flow of smoke or hot gases

3.15**standard supporting construction**

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

3.16**test specimen**

door or shutter assembly that is to be installed in a standard or associated supporting construction to allow it to be evaluated

3.17**through connection**

fixing or internal spacer that either penetrates through the door or shutter construction from one face to another or directly connects the faces one to the other

3.18**transom**

member that extends across the frame from jamb to jamb at the head of the leaf and which creates an aperture to house a transom panel

**3.19
transom panel**

fixed panel that is incorporated above a door and is bounded on all edges by either the frame head, the jambs or the transom

4 Test equipment

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 vertical specimens the wall testing furnace is suitable, for horizontal specimens, the floor furnace is applicable.

4.2 Measurement of heat flux from the unexposed surface of specimens shall be made as described in 9.5.

5 Test conditions

Test conditions require the application of the heating and pressure conditions of the standard test 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 × 3 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 supporting construction shall be not less than that prescribed in 7.3.1.1.

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6.2 Number of specimens

The number of test specimens shall be selected as described in ISO 834-1. It shall be stated in the test report if testing is carried out from one side only, whether due to the symmetrical nature of the door or because it is required to resist fire from one side only.

6.3 Design of specimen

6.3.1 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.

6.3.2 Where the door or shutter assembly incorporates side, transom or flush over panels, whether glazed or unglazed, these shall be tested as part of the door or shutter assembly. The side panel shall always be on the latch side.

6.3.3 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.

6.4 Construction

The test specimen shall be constructed as described in ISO 834-1.

6.5 Verification

6.5.1 The sponsor shall provide a specification sufficiently detailed 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.

6.5.2 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 shall oversee the manufacture of the door or shutter assembly(ies) that is (are) to be the subject of the test or
- the sponsor shall, 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 that 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 7.3.1.1) 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 7.3.1.1 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 General

7.3.1.1 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, 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.

7.3.1.2 Associated construction

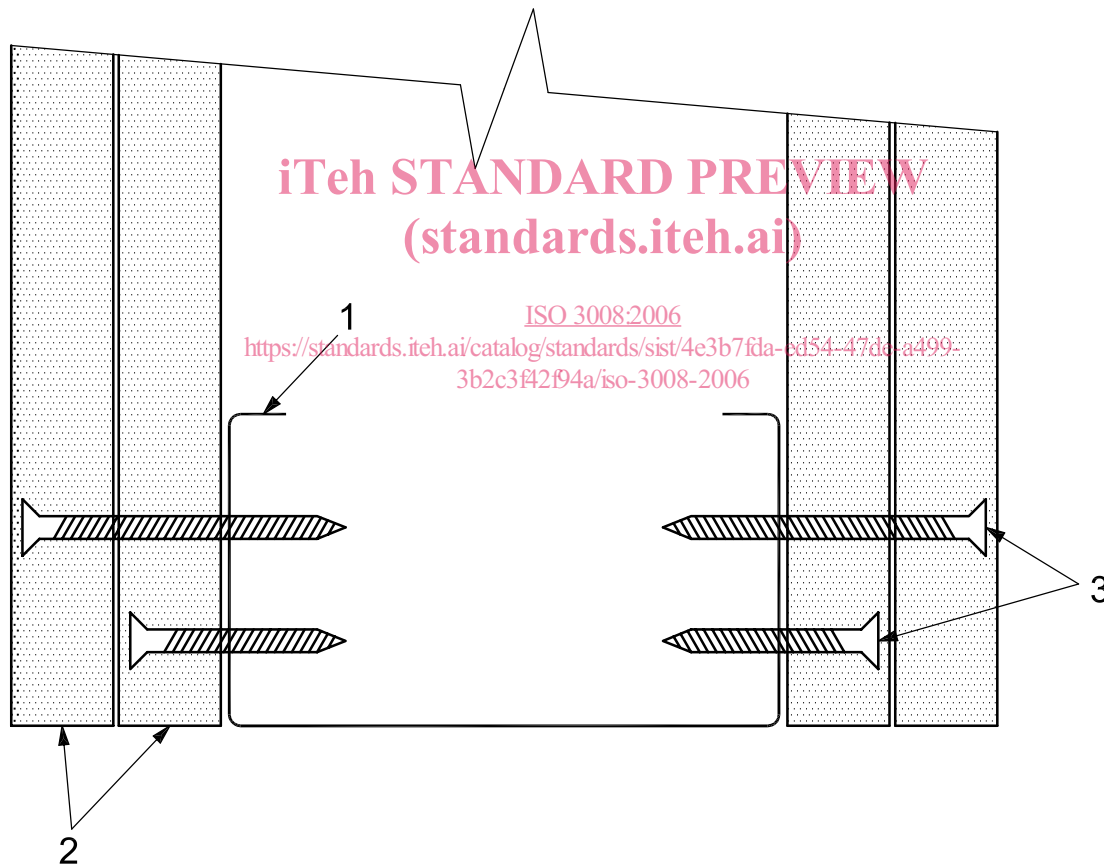
When the test specimen is always installed in a specific, normally proprietary, form of construction that is permanently associated with its intended use in practice, then the specimen shall be installed in a sample of this associated construction.

7.3.1.3 Supporting construction

7.3.1.3.1 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 834-8.

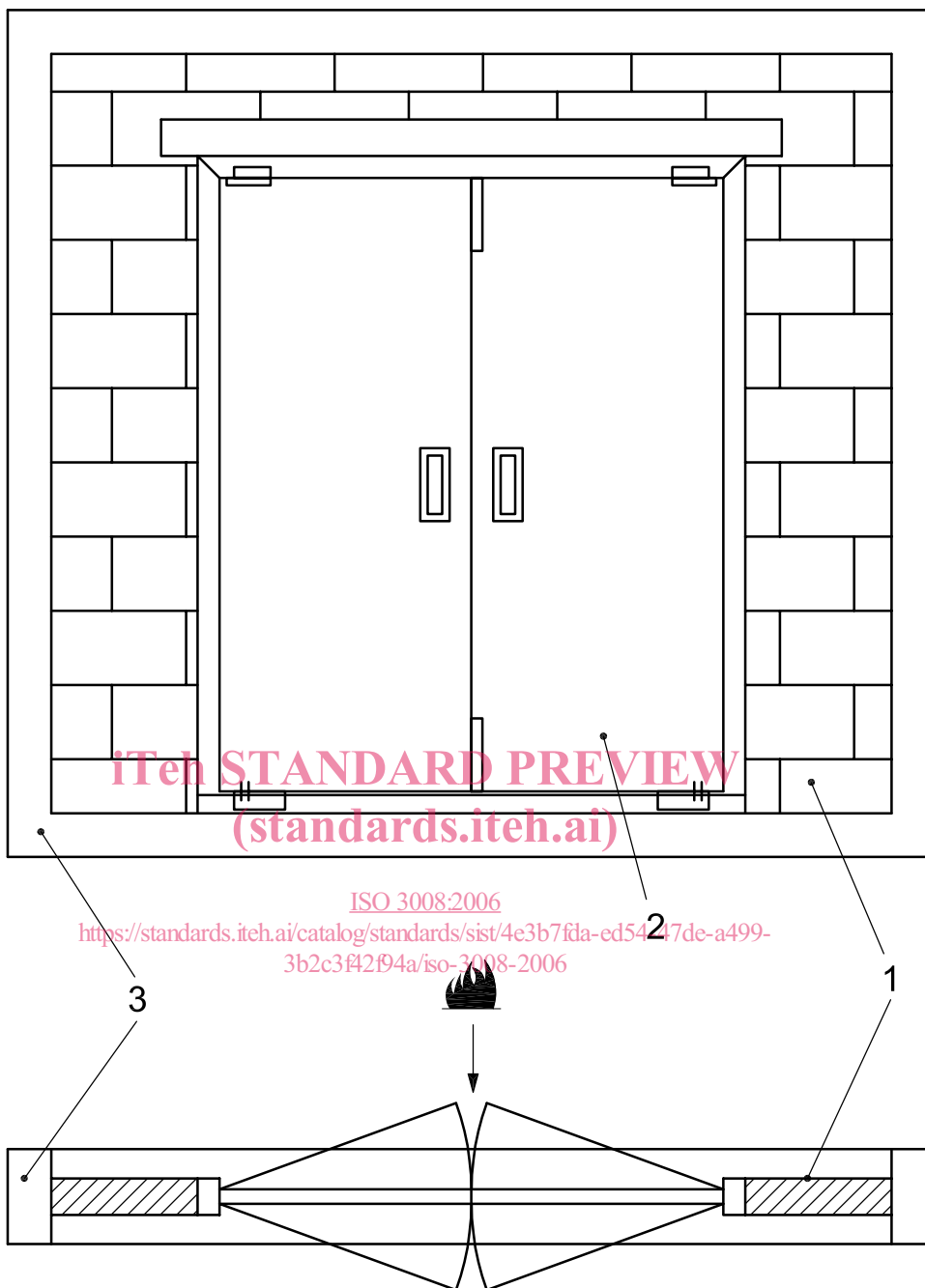
7.3.1.3.2 The choice of standard supporting construction shall reflect the range of intended use for the door or shutter assembly. The rules governing the applicability of the chosen standard supporting construction to other end use situations are given in Clause 13.

7.3.1.3.3 Figures 1 to 8 illustrate the use of supporting constructions in conjunction with the mounting of specimens of different types.



- Key**
- 1 steel vertical 'C' stud
 - 2 12,5 mm plasterboard
 - 3 screws at 300 mm fixing centres

Figure 1 — Example of a horizontal cross section of a flexible standard supporting construction

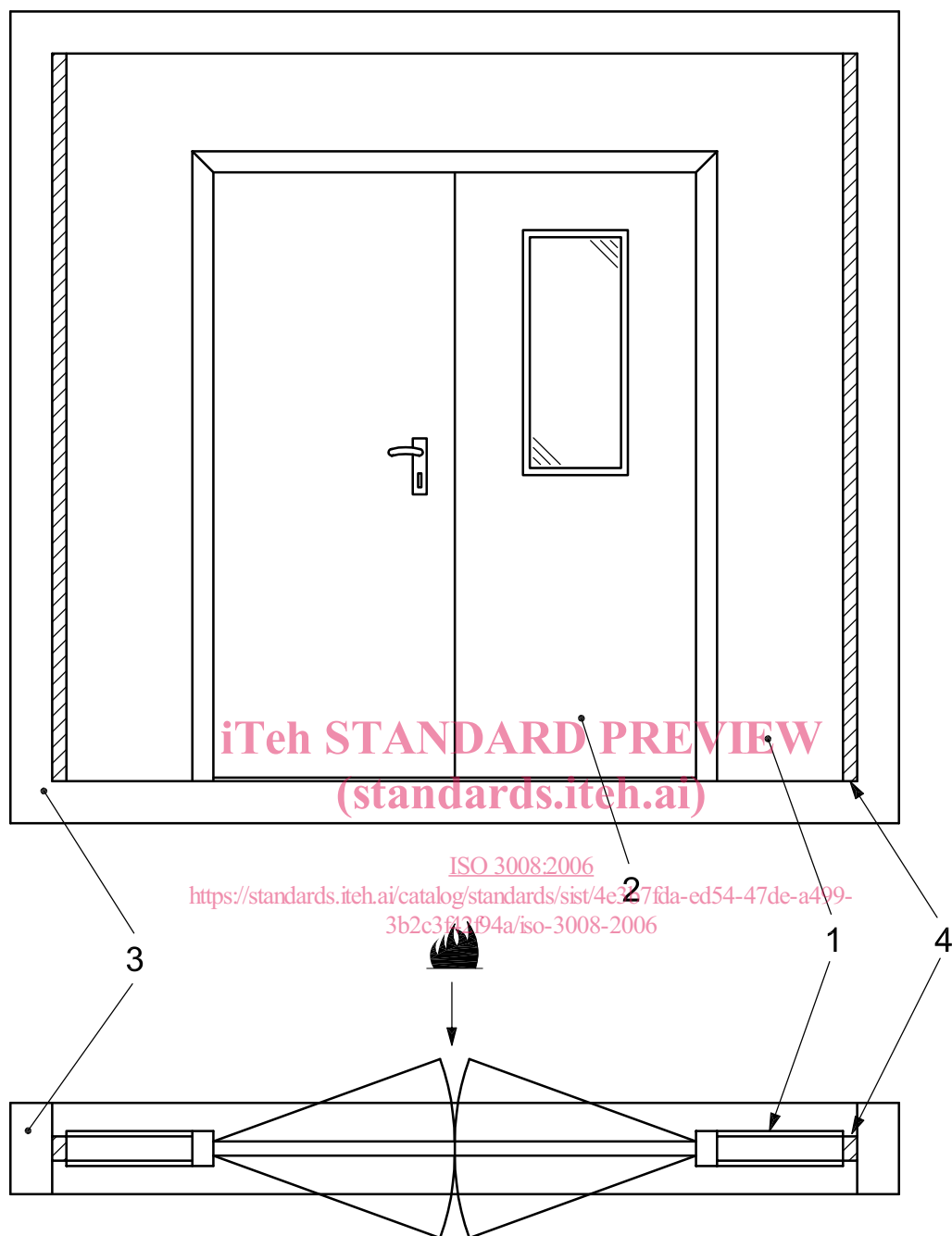


Key

- 1 standard supporting construction (block wall)
- 2 door assembly (test specimen)
- 3 test frame

NOTE 1 + 2 form the test construction.

Figure 2 — Example of door assembly in a rigid standard supporting construction



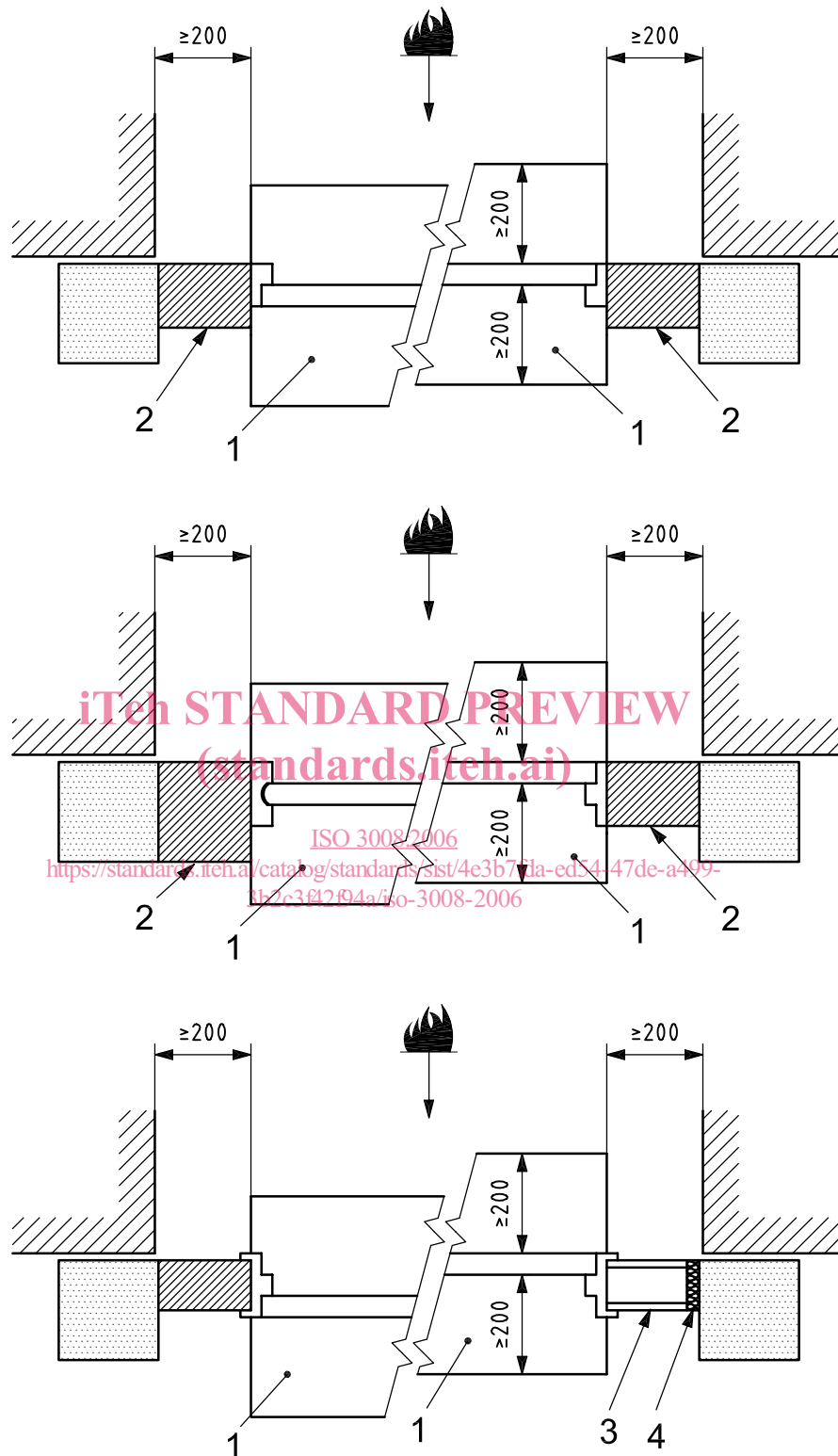
Key

- 1 standard or associated supporting construction
- 2 door assembly (test specimen)
- 3 test frame
- 4 free edge insulation

NOTE 1 + 2 form the test construction.

Figure 3 — Example of a door assembly in flexible standard or associated supporting construction

Dimensions in millimetres



Key

- 1 floor
- 2 standard supporting construction
- 3 associated supporting construction
- 4 free edge insulation

Figure 4 — Example of horizontal sections for mounting hinged door specimens