

Nadomešča:
SIST EN 1634-1:2009

Preskusi požarne odpornosti in dimotesnosti vrat, zapor in oken, ki se odpirajo, ter elementov stavbnega okovja - 1. del: Preskus požarne odpornosti za vrata, zapore in okna, ki se odpirajo

Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware - Part 1: Fire resistance test for door and shutter assemblies and openable windows

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Feuerwiderstandsprüfungen und Rauchschutzprüfungen für Türen, Tore, Abschlüsse, Fenster und Baubeschläge - Teil 1: Feuerwiderstandsprüfungen für Türen, Tore, Abschlüsse und Fenster

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Essais de résistance au feu et d'étanchéité aux fumées des portes, fermetures, fenêtres et éléments de quincailleries - Partie 1: Essais de résistance au feu des portes, fermetures et fenêtres

Ta slovenski standard je istoveten z: EN 1634-1:2014

ICS:

13.220.50	Požarna odpornost gradbenih materialov in elementov	Fire-resistance of building materials and elements
91.060.50	Vrata in okna	Doors and windows
91.190	Stavbna oprema	Building accessories

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EUROPEAN STANDARD

EN 1634-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

January 2014

ICS 13.220.50; 91.060.50

Supersedes EN 1634-1:2008

English Version

Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware - Part 1: Fire resistance test for door and shutter assemblies and openable windows

Essais de résistance au feu et d'étanchéité aux fumées des portes, fermetures, fenêtres et éléments de quincailleries - Partie 1: Essais de résistance au feu des portes, fermetures et fenêtres

Feuerwiderstandsprüfungen und Rauchschutzprüfungen für Türen, Tore, Abschlüsse, Fenster und Baubeschläge - Teil 1: Feuerwiderstandsprüfungen für Türen, Tore, Abschlüsse und Fenster

This European Standard was approved by CEN on 29 December 2012.

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EN 1634-1:2014 (E)**Foreword**

This document (EN 1634-1:2014) has been prepared by Technical Committee CEN/TC 127 "Fire safety in buildings", the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2014, and conflicting national standards shall be withdrawn at the latest by July 2014.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1634-1:2008.

The following changes have been made since the previous edition (not exhaustive):

- definitions updated to include Operable fabric curtain;
- removal of requirement for sponsor declaration on gap values;
- changes to gap measuring requirements in Clause 7;
- increased reference to Extended Application;
- modifications to unexposed face thermocouples in Clause 9;
- redefined temperature measurement requirements in Clause 11 for the normal procedure;
- inclusion of openable windows and operable fabric curtains in Direct Application;
- changes to extended application for gaps in Direct Application;
- changes to figures.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

EN 1634, "Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware" consists of the following parts:

- *Part 1: Fire resistance test for door and shutter assemblies and openable windows* (the present document);
- *Part 2: Fire resistance characterisation test for elements of building hardware*;
- *Part 3: Smoke control test for door and shutter assemblies*.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

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.

It is imperative that an assessment of all potential hazards and risks to health is made and that safety precautions are identified and provided. Written safety instructions need to be issued. Appropriate training should be given to relevant personnel. Laboratory personnel should ensure that they follow written safety instructions at all times.

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EN 1634-1:2014 (E)**1 Scope**

This European Standard specifies a method for determining the fire resistance of door and shutter assemblies and openable windows designed for installation within openings incorporated in vertical separating elements, such as:

- a) hinged and pivoted doors;
- b) horizontally sliding and vertically sliding doors including articulated sliding doors and sectional doors;
- c) folding doors, sliding folding doors /shutters;
- d) tilting doors;
- e) rolling shutter doors;
- f) openable windows;
- g) operable fabric curtains.

This European Standard is used in conjunction with EN 1363-1.

The testing of fire dampers is covered by EN 1366-2.

The testing of closures for conveyor systems is covered by EN 1366-7.

By prior agreement with the test sponsor, additional information may be gained for individual elements of building hardware in order to fulfil the performance criteria identified in EN 1634-2. Based on the observations recorded during the test, the results may be presented in a separate report which should be in accordance with the requirements of EN 1634-2.

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.

EN 1363-1:2012, *Fire resistance tests - Part 1: General Requirements*

EN 1363-2, *Fire resistance tests - Part 2: Alternative and additional procedures*

EN 12519:2004, *Windows and pedestrian doors - Terminology*

EN 13501-2, *Fire classification of construction products and building elements — Part 2: Classification using data from fire resistance tests, excluding ventilation services*

EN 14600, *Doorsets and openable windows with fire resisting and/or smoke control characteristics - Requirements and classification*

EN 15269 (all parts), *Extended application of test results for fire resistance and/or smoke control for door, shutter and openable window assemblies, including their elements of building hardware*

EN ISO 13943:2010, *Fire safety - Vocabulary (ISO 13943:2008)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1363-1:2012, EN 12519:2004, EN ISO 13943:2010 and the following apply.

3.1

door or shutter assembly

doorset

pedestrian doorset or industrial type doorset including any frame or guide, door leaf or leaves, rolling or folding curtain, etc., which is provided to give a fire resisting capability when used for the closing of permanent openings in fire resisting separating elements, which includes any side panel(s), flush over panel(s), transom panel(s) and/or glazing together with the building hardware and any seals (whether provided for the purpose of fire resistance or smoke control or for other purposes such as draught or acoustics) which form the assembly

3.2

openable (for windows only)

applying to windows with one or more moveable leaf or leaves including any side or over panel(s), perimeter frame and any elements of building hardware

3.3

building hardware

hinges, handles, locks, exit devices, escutcheons, letter plates, kick plates, sliding gear, closing devices, electrical components, wiring, etc., which are, or can be, used in the doorset

3.4

single action

action of a door leaf of a (single or double leaf) doorset which only opens in one direction

3.5

double action

action of a door leaf of a (single or double leaf) doorset which opens in both directions

3.6

floor

upper surface of the horizontal element on which the doorset is mounted and which extends from the exposed face to the unexposed face of the doorset

3.7

sill

member which connects two frame jambs together at the base which may or may not be set into the floor and remains visible

3.8

gap

clearance between two nominally adjacent surfaces and/or edges (primary gaps are between the edge of the leaf and the reveal of the frame, between the face of the leaf and the frame stop and between adjacent leaves)

Note 1 to entry: This does not refer to the integrity failure gap for which the gap gauges are referenced in 10.2.2.

3.9

through component or connection

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

EN 1634-1:2014 (E)**3.10****standard supporting construction**

form of construction used to close off the furnace and to support the doorset or openable window 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

Note 1 to entry: Supporting constructions which are considered to be 'standard supporting constructions' are those listed in EN 1363-1.

3.11**associated supporting construction**

specific construction in which the doorset or openable window is to be installed 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

3.12**test specimen**

doorset or openable window which is to be installed in a standard or associated supporting construction to allow it to be evaluated

3.13**transom**

horizontal member fitted between vertical frame members to create an aperture above into which a panel, glazing etc. might be fitted

3.14**over panel**

panel which is incorporated within a doorset or openable window and fitted above the leaf or leaves and can be a transom panel or a flush over panel

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3.15**transom panel**

panel which is incorporated within a doorset or openable window and fitted above the leaf or leaves and is bounded on all edges by the frame head, the jambs and the transom

3.16**flush over panel**

panel which is incorporated within a doorset or openable window and fitted above the leaf or leaves within the frame head and the jambs and with no transom

3.17**side panel**

panel which is incorporated within a doorset or openable window and fitted at one side of a leaf and is bounded on all edges by the perimeter frame, the jambs and the transom (when applicable)

3.18**operable fabric curtain**

doorset with a leaf constructed from woven material combined with other materials in one or more sections

Note 1 to entry: The complete assembly includes any frames and/or guides.

4 Test equipment

The test equipment specified in EN 1363-1, and if applicable EN 1363-2, shall be used.

5 Test conditions

Appropriate mechanical pre-test conditioning shall be completed in accordance with the requirements in EN 14600.

The heating and pressure conditions and the furnace atmosphere shall conform to those given in EN 1363-1 or, if applicable, EN 1363-2 except for openable windows where the pressure at the top of the test specimen shall be 20 Pa.

6 Test specimen

6.1 General

Guidance on the selection of test specimen(s) is given in EN 14600 and the EN 15269 series of extended application standards.

The figures included with this standard show test specimen(s) of different types of doorsets. The figures may also be used by analogy for openable windows.

6.2 Size

The test specimen and all its components shall be full size unless limited by the size of the front opening of the furnace which will normally be 3,0 m x 3,0 m. Doorsets and openable windows which cannot be tested at full size shall normally be tested to the maximum size possible consistent with 7.2.3.

6.3 Number

The number of test specimens required to determine the fire resistance of a doorset or an openable window shall be selected in accordance with EN 1363-1 and 13.4 of this standard.

6.4 Design

The design of the test specimen and the choice of supporting construction shall take into account the requirements of EN 15269 (all parts) and Clause 13 of this standard if the widest field of application is to be achieved.

Where the doorset or openable window incorporates side, transom or flush over panels, whether glazed or unglazed, these shall be tested as part of the assembly. If only one side panel is incorporated, this shall always be installed on the latch side of the doorset or openable window.

The test specimen shall be fully representative of the doorset or openable window intended for use in practice, including any aspects of design that are an essential part of the test specimen and may influence its behaviour in the test.

6.5 Construction

The test specimen shall be constructed as described in EN 1363-1.

6.6 Verification

The sponsor shall provide a specification to a level of detail sufficient to allow the laboratory to conduct a detailed examination of the test specimen before the test and to agree the accuracy of the information supplied (e.g. a parts list and drawings giving materials, dimensions and mounting and fixing methods,

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including those for items of building hardware). EN 1363-1 provides detailed guidance on verification of the test specimen.

When the method of construction precludes a detailed survey of the test 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:

- a) the laboratory shall request to oversee the manufacture of the doorset or openable window which is to be the subject of the test; or
- b) the sponsor shall, at the discretion of the laboratory, be requested to supply an additional test specimen or that part of the test specimen which cannot be verified (e.g. a door leaf) to the number required for testing; the laboratory shall then choose freely which of these shall be submitted to the test and which shall be used to verify the construction.

6.7 Building hardware

Any item of building hardware shall be measured, analysed and described in detail before the test commences. Where it is not possible to confirm the manufacturer's description it shall be clearly stated that the manufacturer's declaration has been used.

7 Installation of test specimen**7.1 General**

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The test specimen shall be installed, as far as possible, in a manner representative of its use in practice.

The test specimen shall be mounted in a supporting construction which covers the type in which it is intended to be used. The design of the connection between the doorset or openable window and the supporting construction, including any fixings and materials used to make the junction, shall be as used in practice and shall be regarded as part of the test specimen. The test specimen shall be mounted within the supporting construction so that it is flush with the exposed face of the supporting construction, unless the normal mounting procedure provided does not allow this.

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

7.2 Supporting construction**7.2.1 General**

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

7.2.2 Standard supporting construction

The choice of standard supporting construction shall reflect the intended normal use of the doorset or openable window. The rules governing the applicability of the chosen standard supporting construction to other end use situations are given in 13.5.

The standard supporting construction shall be chosen from those given in EN 1363-1.

7.2.3 Erection of standard supporting and associated supporting constructions

Figures 1 to 8 illustrate the use of supporting constructions in conjunction with the mounting of test specimens of different types of door or shutter assemblies.

For flexible standard supporting constructions and all associated supporting constructions, the partition or wall shall be erected so that it can distort freely perpendicular to the plane of the supporting construction along the vertical edges, i.e. there shall be a free edge at each vertical end of the test construction.

For rigid standard supporting constructions the wall shall be erected with no freedom to distort perpendicular to the plane of the wall along the vertical edges, i.e. it shall be fixed to the inside of the test frame as in practice.

The supporting construction shall be built within a test frame conforming to EN 1363-1. The supporting construction shall be prepared in advance of the mounting of the test specimen leaving an aperture of the desired size, except when it is normally erected in conjunction with the doorset or openable window using appropriate fixing methods.

There shall be a minimum zone of supporting construction of 200 mm wide within the furnace opening, 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 a minimum width of 200 mm supporting construction to separate test specimens within a rigid supporting construction but a minimum width of 300 mm supporting construction to separate test specimens within a flexible or an associated supporting construction and a minimum separation of 200 mm between each test specimen and the edges of the test frame.

If the bottom of the doorset or openable window is at floor level in practice, then at the bottom of the aperture continuity of the floor shall be simulated using a floor extension of a solid non-combustible material which has a minimum dimension of 200 mm from the leaf or leaves on each side of the test specimen (i.e. from the exposed and the unexposed face) and which has a density of at least 450 kg/m^3 . The furnace floor can be regarded as part of the simulation of the floor continuity provided that it is level with the base of the test specimen. If a sill detail is incorporated as part of the doorset or openable window this shall be incorporated within or placed on top of the floor extension. If the doorset or openable window is not to be used at floor level, and provided that it has a frame detail to all four sides of the aperture, then it may be mounted simply within the thickness of the wall, without a floor extension.

NOTE When a doorset or openable window is tested in conjunction with a non-combustible floor covering then, in certain circumstances, this will not represent the situation when the doorset or openable window is installed in conjunction with a combustible floor covering, e.g. timber or textile.

7.3 Gaps

The adjustment of the door leaf(-ves) or shutter and gaps shall be representative of those used in practice so that appropriate clearances exist (e.g. between the fixed and moveable components); however in all cases the maximum through gap shall not exceed 25 mm at the sill or 6 mm by 150 mm in other areas as these gaps would constitute Integrity failure (gap gauge method).

The size of the gaps between the fixed and the moveable components of a doorset or window will have an influence on its overall fire performance. Therefore the size of these gaps that will be permitted in practice will depend on the size of the gaps in the test specimen. These may be different for different parts of the door or window e.g. leading edge to frame, hinged edge to frame, leaf top edge to frame, leaf bottom edge to frame/sill, meeting stiles.

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Certain gaps are more critical than others and these have been identified as 'primary' gaps, i.e. gaps perpendicular to the face of the leaf or tightness, as shown in Figures 9 to 12 and Figure 33. Measurements shall be taken in accordance with 10.1.2.

8 Conditioning**8.1 Moisture content**

The test specimen shall be conditioned in accordance with EN 1363-1. Requirements for conditioning of supporting constructions are given in Annex A.

8.2 Mechanical

Mechanical pre-test conditioning of the test specimen before fire testing shall be carried out as required by EN 14600.

9 Application of instrumentation**9.1 Thermocouples****9.1.1 Furnace thermocouples (plate thermometers)**

Plate thermometers shall be provided in accordance with EN 1363-1. They shall be evenly distributed over a vertical plane $100 \text{ mm} \pm 50 \text{ mm}$ from the nearest plane of the test construction (see Figure 13). There shall be at least one plate thermometer for every $1,5 \text{ m}^2$ of the exposed surface area of the test construction, subject to a minimum of four.

The plate thermometers shall be oriented so that side 'A' faces the back wall of the furnace.

9.1.2 Unexposed face thermocouples**9.1.2.1 General**

Where no evaluation against the insulation criteria is required of the doorset or openable window, or any part thereof, no temperature measurements are required.

Where compliance with the insulation criteria is required to be evaluated, thermocouples of the type specified in EN 1363-1 shall be attached to the unexposed face of the doorset for the purpose of obtaining the average and maximum surface temperatures. For door leaves, the positioning relates to the part of the door leaf visible from the unexposed side. General principles for the attachment and exclusion of thermocouples given in EN 1363-1 shall apply.

Evaluation of insulation against a supplementary procedure (see 9.1.2.4) is provided in addition to the normal requirement. The sponsor shall instruct the laboratory if he requires evaluation of the doorset or openable window also against the supplementary procedure as this requires the application of additional thermocouples for this purpose.

The temperature of the supporting construction in which the test specimen is mounted is not required to be measured and therefore no thermocouples are required to be attached to it.

No thermocouple shall be placed within 100 mm (or 50 mm when evaluating for the supplementary procedure) from the centre of any component of building hardware which passes through the doorset or openable window.

If a thermocouple has to be relocated because of these requirements, then any other restriction (e.g. the distance from the door leaf edge) shall be maintained when the new location is selected.

If the same situation occurs on the door frame, an equivalent solution shall be followed.

NOTE This can result in some thermocouples being positioned on elements of building hardware.

Where a fire resisting sliding door incorporates a pass door, the pass door, including its frame, shall be fire resisting to at least the same classification as the sliding door into which it is mounted. There shall not be any thermocouples positioned closer than 100 mm (25 mm for the supplementary procedure) either side of the clearance gaps between the pass door leaf and its frame.

Examples of the location of unexposed face thermocouples are shown in Figures 14 to 27.

9.1.2.2 Average temperature

Position five thermocouples (for single or double leaf doors), one at the centre of the door leaf (leaves) and one at the centre of each quarter section. These thermocouples shall not be located in any position excluded for the measurement of maximum temperature (in the normal procedure) and shall not be closer than 50 mm to any joint, stiffener or through component, nor closer than 100 mm to the edge of the door leaf (or leaves) or curtain.

For doorsets or openable windows which incorporate discrete areas of different thermal insulation $\geq 0,1 \text{ m}^2$ (e.g. flush over panels, transom panels, side panels, or glazed panels within a door leaf but not astragals), extra thermocouples shall be evenly distributed over the surface of those areas to determine the average temperature at a density of one thermocouple per square metre or part thereof. When the total area of a single portion of the doorset or openable window represents less than $0,1 \text{ m}^2$, it shall be disregarded for the purpose of ascertaining the average unexposed face temperature.

9.1.2.3 Maximum temperature

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9.1.2.3.1 General

The maximum temperature shall be determined from the thermocouples fixed to determine the average temperature rise (as given in 9.1.2.2), the roving thermocouple and from additional thermocouples fixed as indicated in 9.1.2.3.2, 9.1.2.3.3 and 9.1.2.3.4.

If the doorset or openable window incorporates discrete areas of different thermal insulation $\geq 0,1 \text{ m}^2$ (e.g. flush over panels, transom panels, side panels or glazed panels within a door leaf but not astragals) which are required to be evaluated separately with respect to average temperature rise, then the evaluation of maximum unexposed face temperature of those areas shall also be undertaken separately. This may require extra unexposed surface thermocouples to be applied as given in 9.1.2.3.3 and 9.1.2.3.4. See Figure 28.

Thermocouples shall not be placed on fasteners with a surface diameter less than 12 mm.

9.1.2.3.2 Temperature of frame

Thermocouples shall be fixed at:

- a) one at mid-height on each vertical member;
- b) one on the horizontal top member of the frame and any transom ($\geq 12 \text{ mm}$ wide) fitted, at mid width (100 mm away from the door joint of a multi-leaf doorset on the primary leaf side). The positioning of the transom thermocouples in vertical direction shall be symmetrical relative to the edges. See Figures 23 and 24 in terms of transom;