

English Version

Doorsets and openable windows with fire resisting and/or smoke
control characteristics - Requirements and classification

Blocs-portes et fenêtres ouvrantes résistant au feu et/ou
pare-fumées - Exigences et classification

Tore, Türen und zu öffnende Fenster mit Feuer- und/oder
Rauchschutzeigenschaften - Anforderungen und
Klassifizierung

This European Standard was approved by CEN on 25 May 2005.

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Foreword

This European Standard (EN 14600:2005) has been prepared by Technical Committee CEN/TC 033 “Doors, windows, shutters, building hardware and curtain walling”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by February 2006, and conflicting national standards shall be withdrawn at the latest by February 2006.

Annex E and F of this document provide information relating this document to other relevant European Standards, some of which are in the course of development.

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Introduction

Fire resisting doorsets and openable windows are required to provide adequate protection to openings in fire resisting walls or partitions which are formed as doorways for the passage of people, goods or vehicles. Smoke control characteristics may be added to fire resisting doorsets or may be required as a sole characteristic for smoke control doorsets to provide smoke leakage protection to doorways in walls or partitions which are not required to be fire resisting.

Fire resisting doorsets and openable windows and smoke control doorsets can only provide their designed fire resistance or smoke control capability when they are in the closed position.

This European Standard identifies the requirements and methods of conformity necessary to demonstrate that a measured fire resistance or smoke control capability can be assumed to cover their designed working life. To that end, this document identifies operational requirements and test/inspection methods which are intended to demonstrate durability of self closing and operational capabilities combined with fire resistance and/or smoke control.

In order to ensure continued performance of the characteristics, there is a need for routine inspection and maintenance. See normative Annex C.

1 Scope

This European Standard identifies the particular requirements and classifications necessary to demonstrate the characteristics of fire resistance, smoke leakage control and self closing durability for pedestrian doorsets, industrial type doorsets and openable windows.

Requirements for performance characteristics for these products can be found in the appropriate product standards.

This document does not cover any component reliability or durability testing of mechanical heat detectors (e.g. fusible link devices).

The requirements relating to the use of alternative items of building hardware are provided.

NOTE 1 Fire resistance of doorsets and fire resistance of openable windows and smoke control of doorsets which differ from the original test specimen(s) are covered by the fields of direct and extended application relative to the result of test(s) to EN 1634-1 for fire resistance and EN 1634-3 for smoke control.

NOTE 2 Smoke venting windows designed to open in the event of fire are not covered by this standard.

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.

EN 179, *Building hardware – Emergency exit devices operated by a lever handle or push pad – Requirements and test methods*

EN 572-9:2004, *Glass in building – Basic soda lime silicate glass products – Part 9: Evaluation of conformity/Product standard*

EN 1096-4:2004, *Glass in building – Coated glass – Part 4: Evaluation of conformity/Product standard*

EN 1125, *Building hardware – Panic exit devices operated by a horizontal bar – Requirements and test methods*

EN 1154, *Building hardware – Controlled door closing devices – Requirements and test methods*

EN 1155, *Building hardware – Electrically powered hold-open devices for swing doors – Requirements and test methods*

EN 1158, *Building hardware – Door coordinator devices – Requirements and test methods*

EN 1191, *Windows and doors – Resistance to repeated opening and closing – Test method*

EN 1279-5:2001, *Glass in building – Insulating glass units – Part 5: Evaluation of conformity*

EN 1303, *Building hardware – Cylinders for locks – Requirements and test methods*

EN 1364-1, *Fire resistance tests for non-loadbearing elements – Part 1: Walls*

EN 1527, *Building hardware – Hardware for sliding doors and folding doors – Requirements and test methods*

EN 1634-1, *Fire resistance tests for door and shutter assemblies – Part 1: Fire doors and shutters*

prEN 1634-2, *Fire resistance tests for door and shutter assemblies – Part 2: Fire door hardware – Building hardware for fire resisting doorsets and openable windows*

EN 1634-3, *Fire resistance tests for door and shutter assemblies – Part 3: Smoke control doors and shutters*

EN 14600:2005 (E)

EN 1748-1-2:2004, *Glass in building – Special basic products – Borosilicate glasses - Part 1-2: Evaluation of conformity/Product standard*

EN 1748-2-2:2004, *Glass in building – Special basic products – Glass ceramics - Part 2-2: Evaluation of conformity/Product standard*

EN 1863-2:2004, *Glass in building – Heat strengthened soda lime silicate glass – Part 2: Evaluation of conformity/Product standard*

EN 1906, *Building hardware – Lever handles and knob furniture – Requirements and test methods*

EN 1935, *Building hardware – Single-axis hinges – Requirements and test methods*

EN 12051, *Building hardware – Door and window bolts – Requirements and test methods*

EN 12150-2:2004, *Glass in building – Thermally toughened soda lime silicate safety glass – Part 2: Evaluation of conformity/Product standard*

EN 12209, *Building hardware – Locks and latches – Mechanically operated locks, latches and locking plates – Requirements and test methods*

EN 12337-2:2004, *Glass in building – Chemically strengthened soda lime silicate glass – Part 2: Evaluation of conformity/Product standard*

EN 12433-1:1999, *Industrial, commercial and garage doors and gates – Terminology – Part 1: Types of doors*

EN 12433-2:1999, *Industrial, commercial and garage doors and gates – Terminology – Part 2: Parts of doors*

EN 12453, *Industrial, commercial and garage doors and gates – Safety in use of power operated doors – Requirements*

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

EN 12605, *Industrial, commercial and garage doors and gates – Mechanical aspects – Test methods*

prEN 12650-2, *Building hardware – Powered pedestrian doors – Part 2: Safety at powered pedestrian doors*

EN 13024-2:2004, *Glass in building – Thermally toughened borosilicate safety glass – Part 2: Evaluation of conformity/Product standard*

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

prEN 13633, *Building hardware – Electrically controlled panic exit systems for use on escape routes – Requirements and test methods*

prEN 13637, *Building hardware – Electrically controlled emergency exit systems for use on escape routes – Requirements and test methods*

EN 14178-2:2004, *Glass in building – Basic alkaline earth silicate glass products – Part 2: Evaluation of conformity/Product standard*

EN 14179-2:2001, *Glass in building – Heat soaked thermally toughened soda lime silicate safety glass – Part 2: Evaluation of conformity/Product standard*

prEN 14321-2:2001, *Glass in building – Thermally toughened alkaline earth silicate safety glass – Part 2: Evaluation of conformity/Product standard*

EN 14449:2002, *Glass in building – Laminated glass and laminated safety glass – Evaluation of conformity/Product standard*

prEN 14637:2003, *Building hardware – Electrically controlled hold-open systems for fire/smoke door assemblies – Requirements, test methods, application and maintenance*

prEN 14846, *Building hardware – Locks and latches – Part 3: Electromechanically operated locks and striking plates – Requirements and test methods*

CEN/TS 54-14:2004, *Fire detection and fire alarm systems – Part 14 Guidelines for planning, design, installation, commissioning, use and maintenance*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 12433-1:1999, EN 12433-2:1999, EN 12519:2004, prEN 14637:2003 and the following apply.

3.1

closing device

device to be attached to a doorset or openable window which provides a return to the closed position

3.2

designed working life

period of time for which the complete assembly is designed to operate, when installed and maintained in accordance with the manufacturer's instructions

3.3

door co-ordinating device

mechanism which ensures the correct sequence of closing of double leaf single swing doorsets

3.4

fire resisting 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. This includes any side panels, vision panels or transom panels together with the door 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

3.5

fitness for purpose

ability of a product, process or service to serve a defined purpose under specific conditions

3.6

friable material

material that changes in physical size under mechanical impact, acceleration, deceleration, in such a way that its performance for the intended use is considered to have changed in a negative manner (for example mineral wool without binders)

3.7

hold open device

element of the hold-open system that allows a self-closing fire/smoke control doorset or openable window to remain open at either a pre-set or chosen position until released

3.8

industrial type doorset

doorset of a type generally used for the passage of vehicles, but which may in some circumstances be used for pedestrian access in public locations such as retail or sporting venues

3.9

local heat detector

device installed local to the doorset which will activate at a defined temperature to release a door closing mechanism. Two types of local heat detectors are covered by this reference;

- (a) electrically operated heat detectors according to EN 54-5,
- (b) mechanically operated heat detectors (e.g. fusible link devices)

NOTE Local heat detectors type (b) are not elements of electrically controlled hold open systems according to prEN 14637.

3.10
openable window

window with one or more moveable elements including any fixed or removable side or overpanel(s)

NOTE Fixed windows without any openable elements are not subject to fire resistance testing for doorsets, but to the testing for partitions to EN 1364-1.

3.11
particular product design

doorset or openable window manufactured to a common construction principle (e.g. lid and tray construction for steel doorsets or framed-up construction for timber door leaves) which permits the use of the fields of direct and extended application rules

3.12
pedestrian doorset

doorset intended primarily for the use of pedestrians

3.13
self closing

ability of an open door or window to close fully into its frame and engage any latching device that may be fitted, without human intervention, by stored energy, or by mains power backed up by stored energy in case of power failure

3.14
smoke control doorset

pedestrian doorset or industrial type door assembly including any frame or guide, doorleaf or leaves, rolling or folding curtain, etc. which is provided to give a smoke leakage control capability when used for the closing of permanent openings in separating elements. This includes any side panels, vision panels or transom panels, together with the door building hardware and any seals (whether provided for the purpose of fire resistance or smoke control or for other purposes such as draught or acoustic) which form the assembly

3.15
uncontrolled door closer

door closing device where the energy for closing the door is stored within a spring being part of the spring closer mechanism, without provision for control of the closing speed of the door leaf

4 Requirements

4.1 General

The performance of fire resisting doorsets and fire resisting openable windows and smoke control doorsets shall be in accordance with the appropriate product standard, and shall meet the following requirements for testing on a specimen product.

Fire resisting doorsets and fire resisting openable windows and smoke control doorsets shall be capable of achieving the closed position insofar as in the closed position they shall be capable of achieving the declared fire resistance/smoke control performance. Where the correct closing sequence of a self closing double leaf doorset or openable window is essential to its fire performance or smoke control capability (for example where overlapping leading edges are included) the correct sequence shall be ensured by the use of a door co-ordinator device complying with EN 1158 or to the appropriate European Technical Specification for the device used.

The requirements of 4.2 to 4.10 shall be fulfilled for at least one complete specimen of the particular product design.

NOTE 1 Guidance regarding the number of test specimens will be found in the relevant test methods.

NOTE 2 To gain the maximum benefit from a product range, a manufacturer should test the most onerous arrangement intended for production. This may be the largest size, or the least favourable arrangement, or a combination of the two. Further guidance on this may be found in the standard(s) relating to the extended application of fire test and smoke control test results when they become available.

4.2 Operability

The operability of the test specimen for fire resistance and smoke control shall be demonstrated by testing in accordance with 5.1.1.1, which in the case of self closing side hung doorsets and windows shall be followed by testing in accordance with 5.1.1.3 or 5.1.1.4 as appropriate.

4.3 Characteristics for building hardware for use on fire resisting doorsets or fire resisting openable windows and smoke control doorsets

4.3.1 General

Pedestrian doorsets and openable windows shall incorporate items of building hardware which comply with the appropriate classifications given in Annex A where such classifications apply.

4.3.2 Selection of hardware for test specimens

Wherever possible, test specimens for pedestrian doorsets and openable windows shall incorporate elements of building hardware which comply with the appropriate classifications given in Annex A.

When a door or window test specimen exceeds the limits given in the harmonised technical specifications listed in Annex A, then the assembly shall be tested to meet the requirements of 4.8 and when applicable any other European Technical Specification required to prove fitness for purpose for the particular item of building hardware.

NOTE This form of wording is used because there are European Technical Specifications currently in the course of preparation for elements where size/weight restrictions given in Annex A are applicable.

The values of the maximum door leaf mass and the maximum door width; where given in the Table of Annex A, may be exceeded if it can be verified that the results of a complete test specimen according to its classification are positive after the durability test.

The test shall be carried out with a test specimen of specified dimensions and mass according to EN 1191. The test results can only be applied to a door or window of a similar product design.

Rules for the incorporation of alternative elements of building hardware shall be as 4.10.2.

4.3.3 Uncontrolled door closers

Where uncontrolled door closers (for example spring hinges) are permitted by national legislation for use as a means of self-closing fire resisting doorsets, their operation shall fulfil the requirements of 5.1.1.3 and where appropriate 5.1.1.4 of this document.

4.4 Seals and gaskets

Applied strips (for example intumescent materials), seals and gaskets (including those performing functions other than for fire or smoke) which are part of the doorset or openable window and their attachment technique shall be tested in accordance with EN 1634-1 to demonstrate their fire resistance capability or EN 1634-3 to demonstrate their smoke control capability.

Rules for the incorporation of alternative seals and gaskets shall be as 4.10.3.

4.5 Glazed elements

When doorsets and openable windows are designed to incorporate glazed elements the complete assembly, including the largest size of glazed element intended to be used in practice, shall be tested for fire resistance/smoke control and self closing (when required) to ensure that the glazed elements and their method of fixing into the door leaf or window meet the test requirements.

Glass used in glazed elements shall meet one of the standards given in Annex D.

Rules for the incorporation of alternative glazed elements shall be as 4.10.4.

4.6 Fire resistance

4.6.1 General requirements

Fire resistance shall be determined by testing to EN 1634-1 and classified in accordance with EN 13501-2.

4.6.2 Shakedown of core material

Where the intended fire resistance of a doorset is based on a construction which incorporates a core of friable material, the specimen prepared for test shall undergo mechanical conditioning identified under 5.1.1.2, which in the case of side hung doorsets shall be followed by testing in accordance with 5.1.1.3 or 5.1.1.4 as appropriate.

For specimens on which this shakedown conditioning is carried out, the demonstration of operability in accordance with 5.1.1.1 may be omitted.

4.7 Smoke control

Smoke control shall be determined by testing to EN 1634-3 and classified in accordance with EN 13501-2.

4.8 Durability of self closing

4.8.1 General requirements

Durability of self-closing shall be determined by testing to EN 1191 for pedestrian doorsets and openable windows or EN 12605 for industrial doorsets, and classified in accordance with Table 1.

During the durability test, fractures, cracks, damage and/or deformation which can affect the door's function shall not occur. At the end of the test, the test specimen shall be fully operational and clearance/expansion gaps shall remain within the tolerances defined in EN 1634-1 and/or EN 1634-3 as appropriate.

Table 1 — Self closing test cycles

Class	Number of test cycles to be performed
C5	200 000
C4	100 000
C3	50 000
C2	10 000
C1	500
C0	0

NOTE Examples of intended use:

- C5 subject to very frequent usage;
- C4 high frequency of use by public with little incentive to exercise care;
- C3 medium frequency of use primarily by those with some incentive to exercise care;
- C2 low frequency of use for those with high incentive to exercise care such as doors to private residence and large industrial and commercial doors;
- C1 retained in the open position;
- C0 no performance determined.

4.8.2 Closing operation

Fire resisting doorsets and openable windows and/or smoke control doorsets can only provide the desired level of fire and/or smoke protection if they are closed. To achieve this, they shall be designed so that they are:

- a) normally maintained closed but used regularly (e.g. doors with self-closing devices), (²for example Class C5, C4 or C3) or
- b) normally held open during periods when buildings are occupied but closed for fire safety and/or security reasons outside of occupied periods (e.g. closed at night) but fitted with a hold open device according to 4.8.3 (²for example Class C2) or
- c) permanently open but fitted with a hold open device according to 4.8.3 (²for example Class C1) or
- d) normally closed and locked into closed position and labelled accordingly (²for example Class C0).

4.8.3 Hold open device

When a hold open device is to be used to override the normal operating conditions of a fire resisting doorset or openable window or smoke control doorset and is supplied as part of the product then such devices shall be in accordance with 5.5 of prEN 14637:2003 and shall be controlled by a hold open system in accordance with 5.4 of prEN 14637:2003. Where such devices are not available for particular products, the device shall be proven by testing either on the specimen prepared for the fire resistance or smoke leakage test or on a separate demonstration test as identified under 5.1.1.5.

For industrial type doorsets and openable windows for which a prEN 14637 proven device is not possible, the mechanism shall be tested in accordance with 5.3.2.

² Classifications are given for guidance only.

Where a local heat detector is permitted by national legislation as part of a release mechanism, it shall be installed local to the doorset and shall respond at 70 °C to release the doorset closing mechanism, except that where normal ambient conditions exceed a value of 40 °C a higher rated local heat detector shall be used to activate the release at 30 degrees above the ambient temperature.

4.9 Safety in use

4.9.1 Use under non-fire conditions

Fire resisting doorsets and openable windows and smoke control doorsets shall meet the performance characteristics of the relevant product standard.

4.9.2 Use under fire conditions

4.9.2.1 Normally held open doorsets and openable windows

Doorsets and openable windows which are normally held open, and which are released to close in fire or smoke conditions, shall have a closing speed which is set not to exceed:

- a) a maximum leading edge speed of 300 mm/s for hinged and pivoted doorsets; and casement windows;
- b) one-tenth of the leaf width per second up to a maximum of 300 mm/s for horizontally closing doorsets and openable windows, or
- c) one tenth of the leaf height per second up to a maximum of 150 mm/s for vertically closing doorsets and openable windows.

NOTE For vertically moving doorsets which close under power operation to an initial smoke protection height of approximately 2 m the requirement c) is relevant for the secondary closing of such power operated doorsets which is completed under controlled gravity descent.

Where industrial type doorsets of types b) and c) above are released from the hold open position, the controlled speed of closing shall be accompanied by audio and visual warnings.

4.9.2.2 Particular requirements for power operated doorsets and openable windows

The self-closing function shall remain operable during fire alert conditions.

Electrical cables used for control functions in respect of the operation of fire resisting doorsets and openable windows and smoke control doorsets shall comply with CEN/TS 54-14.

Where the doorsets and openable windows fail safe to their fire operational position in a controlled manner on the loss of all power supplies, primary and auxiliary, then the electrical cables do not need to be fire rated.

Power operated doorsets and openable windows shall be provided with a means to close the door/window in response to an alarm signal.

They shall be provided with alternative means to close the doorset and openable windows should the mains power supply fail. This may either be from stored energy such as spring power or a weight system or by auxiliary power drawn from standby batteries via an instantaneous changeover should the mains supply fail. The battery and the control system shall have a monitoring device, and shall be capable of providing a minimum of five consecutive cycles of operation at the minimum battery charge.

NOTE The five cycles of operation are required to demonstrate the capability of the doorsets and the openable windows to close under minimum battery charge, including the possible interruption of operation specified in 4.9.2.3. These doorsets are for fire resistance purposes and are not intended to be re-opened as escape route doors.

In some cases auxiliary power operation from instantaneous changeover to standby-generated power supply may be permitted.

4.9.2.3 Release controlled by local heat/smoke detection

During real fire or proof testing conditions, doors or openable windows which are normally retained in the open position may be released from a hold open device which is controlled by a local heat/smoke detector, providing that electrically controlled detectors are selected and positioned in accordance with prEN 14637:2003, Annex A.

Where a local mechanically operated heat detector is permitted by national legislation it shall be installed local to the door, see 4.8.3.

In the case of manually operated door-sets and openable windows the closing function shall be provided by stored mechanical energy (e.g. by controlled door closing devices conforming to EN 1154).

In the case of power operated doorsets and openable windows, the closing function shall either be provided by the powered drive using mains power supply or auxiliary power supply, or by stored mechanical energy (e.g. controlled speed gravity or spring powered closing system or a weight system). During fire conditions the safety in use requirements detailed in prEN 12650-2 or EN 12453, as appropriate, may be reduced or may be disregarded in the case of local mechanical heat detectors.

Control of power operated pedestrian doors under fire conditions shall comply with the requirements of prEN 14637:2003, 5.5.4.

The speed of closing shall be in accordance with 4.9.2.1.

4.9.2.4 Remote heat/smoke detection and release controlled by electrical input

Fire resisting doorsets and openable windows and smoke control doorsets which may be in the open position at the time of a fire, shall be self closing either by stored mechanical energy, or alternatively in the case of power operated doorsets and openable windows, close under main power on receipt of an electrical input signal from either a fire alarm system or a smoke/heat controlled detection device supplied in accordance with prEN 14637. In the case of power operated doorsets and openable windows all the safety in use requirements given in prEN 12650-2 or EN 12453, as appropriate, shall be complied with.

If the main power supply is needed for the closing mode, its interruption shall cause an instantaneous changeover to an auxiliary battery supply under which all the safety in use requirements given in prEN 12650-2 or EN 12453, as appropriate, shall be complied with. In some cases auxiliary power operation from instantaneous changeover to a standby generating system may be permitted.

If the power operated movement of the closing mode is interrupted by the operation of the safety in use protection devices (presence detection), the process shall be repeated every 15 s. The safety aspects according to prEN 14637:2003, 6.1.9 shall be ensured.

In case the mains power supply is interrupted, and there is no auxiliary power supply, the doorset or openable window shall be self-closing by controlled speed gravity action, spring powered or weight closing system at a rate of closure given in 4.9.2.1. For industrial type doorsets, gravity or spring powered closing shall be accompanied by audio and visual warnings when they may close off a normal pedestrian route.

4.9.3 Doors fitted on fire fighting approach routes

When fire resisting doorsets and/or smoke control doorsets are intended for use on fire fighting approach routes, they shall be capable of being opened from the approach side at a height above floor level not exceeding 1,5 m in both normal operating mode and in case of power failure.

Such opening can be by manual or power operation. In the case of power operated doorsets, they shall be fitted with overriding auxiliary manually operated devices on the fire fighting approach side to cover power failure if no other entrance exists.

4.10 Product variations

4.10.1 General

Permissible modifications to the design parameters of tested fire resisting doorsets and openable windows and/or smoke control doorsets are covered by the field of direct application of results given in EN 1634-1 for fire resistance and EN 1634-3 for smoke control, as appropriate. Details shall be in the classification report which shall be prepared in accordance with EN 13501-2.

Further modifications shall be covered by a product specific field of extended application based on testing to EN 1634-1 or EN 1634-3 as appropriate, providing that any such modifications comply with the other requirements of this document.

For products where specific extended application standards relating to the results of EN 1634-1 or EN 1634-3 tests are not available, the manufacturer shall demonstrate that the varied product meets with the relevant regulatory requirements.

4.10.2 Alternative building hardware

Elements of building hardware for pedestrian hinged or pivoted door leaves or for openable windows may be exchanged provided that the requirements identified in Annex A have been complied with for the particular product design.

In addition, for fire resisting and smoke control doorsets and fire resisting openable windows, elements of building hardware may only be exchanged when there is evidence that their fire resistance capabilities have been separately demonstrated on a specimen door or window of the particular product design, when the durability of self-closing requirements of 4.8 and any other relevant European Technical Specification have been fulfilled and when they are fixed with at least the same retaining force as demonstrated by:

- the results of a small scale test to prEN 1634-2, or
 - the results of alternative testing in accordance with EN 1634-1,
- or
- there is evidence of full scale testing of a similarly designed specimen door or window in accordance with EN 1634-1 for fire resistance.

NOTE Exchange of elements of building hardware for fire resisting or smoke control purposes may affect the products' non-fire or smoke characteristics.

4.10.3 Alternative seals and gaskets

Changes are permitted only where alternative seals and gaskets have obtained equal or better classification when part of a fire resistance test to EN 1634-1 or smoke control test to EN 1634-3 on a product with identical frame/panel edge details and are covered by a field of extended application relating to the particular product design and shall have had the durability of self-closing proven in accordance with 4.8 on a doorset of the particular product design to ensure fitness for purpose.

4.10.4 Alternative glazed elements

Alternative glazed elements to those tested on the original specimen are permitted in accordance with the field of direct application section of EN 1634-1 for fire resistance or EN 1634-3 for smoke control. For alternative glazed elements not covered by the field of direct application reference shall be made to the relevant extended application standard (currently in preparation).

NOTE Glass panels on their own do not have a classification. The fire performance characteristics are derived from testing in specific edge framing techniques.

5 Test methods

5.1 Fire resistance

5.1.1 Pre-test conditioning

5.1.1.1 Operability test

Prior to the commencement of the EN 1634-1 fire test, the specimen to be tested shall be checked for operability in the fire test frame by operating from fully closed to fully open to the maximum possible or at least 90 degrees (in the case of hinged or pivoted doorsets and openable windows), for 25 cycles. This opening and closing operation shall be manual unless the doorset is fitted with a self-closing device, in which case, this device shall perform the closing function. Where this is not possible due to furnace or product size restrictions (for example large sliding doors) a minimum movement of 300 mm per cycle is necessary. Evidence of this test shall be documented in the EN 1634-1 test report.

5.1.1.2 Shakedown conditioning for core material

The fire test specimen of a door incorporating friable material shall be subjected to 5 000 cycles of operation prior to the fire test. For manually operated doors the method used shall be as described in EN 1191 or EN 12605 as appropriate, but with a 50 % increase over the reference velocity specified in those standards. For power operated doors, operation shall be by the power operating system at its maximum operating speed. This conditioning shall be carried out with any lock/latch bolt(s) being held in the withdrawn position. Evidence of completion of this conditioning shall be documented in the EN 1634-1 test report.

5.1.1.3 Specimen self closing for doorsets and openable windows without coordinating devices

For hinged and pivoted side hung fire resisting doorsets and openable windows which are declared to be self closing, the specimen which is to be subjected to the fire resistance test shall, after testing as required to 5.1.1.1 or 5.1.1.2, have each leaf opened to $10^\circ \pm 2^\circ$, held for $20\text{ s} \pm 2\text{ s}$ and then released without shock and allowed to close at the speed determined in 4.9.2.1 to ensure that their closed position is achieved.

When uncontrolled door closers are incorporated as a closing device for self closing fire resisting doorsets, the door leaf shall be opened to $30^\circ \pm 2^\circ$.

5.1.1.4 Specimen self closing for doorsets and openable windows fitted with door coordinating devices

For double leaf hinged or pivoted doorsets and openable windows which are self closing and fitted with door coordinating devices, after completion of tests in accordance with 5.1.1.1 or 5.1.1.2 the active leaf of the doorset shall be opened to $10^\circ \pm 2^\circ$ ($30^\circ \pm 2^\circ$ when uncontrolled door closers are incorporated as a closing device for self closing), held for $20\text{ s} \pm 2\text{ s}$ and then released without shock and allowed to close at the speed defined in paragraph 4.9.2.1 to ensure that the closed position is achieved. Following this, both leaves shall be opened together by operating the inactive leaf only to an angle of not more than $10^\circ \pm 2^\circ$ ($30^\circ \pm 2^\circ$ when uncontrolled door closers are incorporated as a closing device for self closing) beyond the minimum waiting position of the co-ordinating device. The inactive leaf shall be held for $20\text{ s} \pm 2\text{ s}$ and then released without shock and allowed to close at the speed defined in 4.9.2.1 to ensure that the closed position is achieved.

For doorsets where the inactive leaf can be opened only after the active leaf is partly opened to unlock the inactive leaf, the active leaf may be opened first beyond the minimum waiting position of the co-ordinating device.

5.1.1.5 Hold open device test

Hold open devices, which may incorporate local heat detectors, and which are used to override the normal operating conditions of a fire resisting doorset and/or smoke control doorset, may be incorporated onto the specimen prepared for testing to EN 1634-1 for fire resistance, or EN 1634-3 for smoke control as appropriate. Where such devices are fitted, they shall be tested for functional response by 25 operations prior to the fire or smoke control test. This test may be combined with the operability test in 5.1.1.1 or 5.2.1 as appropriate.

Where hold open devices are not tested during the preparation for a EN 1634-1 fire resistance test or a EN 1634-3 smoke control test as appropriate, or where alternative release techniques or linkages are proposed, they shall be submitted to a similar demonstrative test which shall be completed on an alternative specimen.

For pedestrian doorsets and openable windows, when the device is part of an element of building hardware, which has been tested to meet a requirement of EN 1155 or prEN 14637 as appropriate, the hold open device test is not necessary.

This document does not cover any component reliability or durability testing of mechanical heat detectors (e.g. fusible link devices). The use of such devices is under the responsibility of the authorising body and the manufacturer shall declare whether the hold open device is fitted with such a device.

5.1.2 Fire resistance test

After completing the pre-test conditioning detailed in 5.1.1 carry out the fire resistance test in accordance with EN 1634-1.

5.2 Smoke control

5.2.1 Pre-test conditioning

Prior to the commencement of an EN 1634-3 smoke control test, the specimen to be tested shall be installed in accordance with the manufacturers instructions onto the smoke test frame and then checked for operability in accordance with 5.1.1.1 and 5.1.1.3 or 5.1.1.4 as appropriate. Evidence shall be recorded in the EN 1634-3 test report.

5.2.2 Hold open device test

For smoke control doors the hold open device test shall be completed in accordance with 5.1.1.5.

5.2.3 Smoke leakage test

After completing the pre-test conditioning detailed in 5.2.1 and 5.2.2 carry out the smoke leakage test in accordance with EN 1634-3. Immediately after the test, the door shall be able to be opened without the use of tools. The result of this pass/fail test shall be documented in the EN 1634-3 test report.

5.3 Durability and operability of self closing

5.3.1 Self closing function

The durability of the self closing operation of fire resisting doorsets and openable windows, and/or smoke control doorsets, for their intended use as defined in Table 1 of 4.8.1, shall be demonstrated by operational testing generally in accordance with EN 1191 for pedestrian doorsets and openable windows and EN 12605 for industrial type doorsets, but with the closing operation to be performed by the self closing mechanism supplied with the doorset and at the normal operational speed of that mechanism.

The test shall either be completed on a specimen door or window which is to be fire resistance or smoke control tested or on an alternative specimen of particular product design and shall be the largest and heaviest variation of the particular product design.

5.3.2 Operability

Following this test, demonstrate that the self closing mechanism is still functional and that the doorset or openable window has not sustained any damage which could affect its functions and that clearance/expansion gaps remain within the tolerances given in EN 1634-1 or EN 1634-3 as appropriate.

6 Summary of evidence required and resulting classifications

6.1 General

To enable classification, the following evidence, where appropriate, shall be summarised:

- fire resistance test(s) to EN 1634-1 including operational test(s) defined in 5.1.1.1 to 5.1.1.4 of this document;
- smoke control test(s) to EN 1634-3 for ambient temperature only, or ambient and medium temperature (200 °C), as appropriate, including operational test(s) defined in 5.2.1 of this document;
- durability of self closing test in accordance with 5.3.1 of this document;
- hold-open device functions in accordance with 5.1.1.5 of this document;
- supporting test evidence for elements of alternative building hardware;
- supporting test evidence for alternative seals or gaskets;
- supporting test evidence for alternative glazing;
- supporting test evidence relating to field of extended application of results.

See informative Annexes E or F as appropriate for the route to classification.

Where testing of more than one specimen is necessary to derive a classification for a particular characteristic, the least favourable result shall be used to determine the classification.

6.2 Classification of fire resistance

Doorsets or openable windows tested in accordance with EN 1634-1 shall be classified in respect of integrity (E), integrity and insulation (EI₁ or EI₂ as defined in EN 13501-2) and integrity and radiation (EW) in accordance with EN 13501-2.

6.3 Classification of smoke control

Doorsets tested in accordance with EN 1634-3 shall be classified in respect of smoke leakage at ambient temperature (S_a) only, or smoke leakage at both ambient and medium temperature (S_m) in accordance with EN 13501-2.

6.4 Classification of the durability of self closing

Doorsets or openable windows tested as specified in 5.3 shall be classified as self closing in accordance with EN 13501-2 by the addition of the designator letter C followed by the class (0 to 5) achieved.

6.5 Examples of classification

A fire resisting doorset tested for integrity to 60 min, for insulation to 30 min and for smoke control at ambient and medium temperature, and which is self closing for 200 000 cycles can be designated E60/EI₂30-S_m-C5.

A smoke control doorset tested only for ambient temperature smoke control and which is self-closing for 50 000 cycles can be designated S_a-C3.

A fire resisting openable window tested for integrity to 30 min, for insulation to 30 min, and which is permanently closed and locked can be designated E30/EI₂30-C0.

7 **Marking**

Requirements for the marking of fire resisting doorsets and openable windows and/or smoke control doorsets is covered in the appropriate product standard. The marking of fire resisting doorsets and fire resisting openable windows and/or smoke control doorsets shall be in accordance with the relevant European product standards.

Marking of components such as building hardware, seals, gaskets etc. shall be in accordance with the relevant component product standards.

8 **Maintenance instructions**

The manufacturer shall provide inspection and maintenance instructions as Annex C.

NOTE The requirements for installation instructions are in the appropriate product standards.

Annex A
(normative)

Characteristics for building hardware for use on fire resisting doorsets or fire resisting openable windows and smoke control doorsets

The items of building hardware shown in Table A.1 may be fitted to fire resisting doorsets or fire resisting openable windows and smoke control doorsets, provided that the limitations shown for leaf or casement mass and/or width derived from the relevant hardware product standards are not exceeded and that the performance levels shown for the relevant characteristics, contained in the relevant hardware product standard and outlined in Annex B, are equalled or exceeded.

Table A.1 — Minimum performance levels for elements of hardware for pedestrian doorsets

Product Group	Relevant EN standard	Max. leaf or casement width covered by the relevant standard#	Maximum leaf or casement mass covered by the relevant standard (kg)	Category of use (see Annex B)	Minimum hardware classification (see Annex B)	Corrosion resistance classification* (see Annex B)
Single axis hinges	EN 1935	1 600 mm	250	Any	3 for windows 7 for doors	1
Controlled door closing devices	EN 1154	1 600 mm	No maximum defined	3	8	1
Electrically powered hold-open devices	EN 1155	1 600 mm	No maximum defined	3	5 or 8	1
Electrically controlled hold-open systems	prEN 14637	No limit	No maximum defined	3	Any	1
Door coordinating devices	EN 1158	1 600 mm	No maximum defined	3	5 or 8	1
Lever handles and knob handles	EN 1906	No limit	No maximum defined	3	7	1
Mechanical locks and latches	EN 12209	No limit	No maximum defined	3	L	A
Cylinders for locks	EN 1303	No limit	No maximum defined	1	Any	1

Table A.1 (concluded)

Emergency exit devices	EN 179	No limit	No maximum defined	3	7	3
Panic exit devices	EN 1125	No limit	No maximum defined	3	7	3
Door and window bolts	EN 12051	No limit	No maximum defined	3	4	1
Sliding and folding door hardware	EN 1527	No limit	No maximum defined	-	3	1
Electromechanically operated locks & striking plates	prEN 14846	No limit	No maximum defined	L	3	C
Electrically controlled emergency exit systems	prEN 13637	1 300 mm	No maximum defined	3	7	3
Electrically controlled panic exit systems	prEN 13633	1 300 mm	No maximum defined	3	7	3

These limit values are contained in the relevant hardware product standards.

Annex B (normative)

Classification requirements for elements of building hardware

Most but not all the EN standards for building hardware follow the common format of classification requirements shown below, although in some cases all the available classes are not used. In the context of this document the following classifications shall apply.

Category of use:

Grade 1:	Low frequency of use by people with a high incentive to exercise care and with a small chance of accidents occurring or of misuse.
Grade 2:	Medium frequency of use by people with some incentive to exercise care but where there is some chance of accidents occurring or of misuse.
Grade 3:	High frequency of use by public and others with little incentive to exercise care and with a high chance of accidents occurring or of misuse.
Grade 4:	For use on doors which are subject to frequent violent usage.

Minimum hardware classifications:

Durability/Number of test cycles:

Grade 1:	2 500 cycles
Grade 2:	5 000 cycles
Grade 3:	10 000 cycles
Grade 4:	25 000 cycles
Grade 5:	50 000 cycles
Grade 6:	100 000 cycles or Grade L 100 000 cycles with 25N side load
Grade 7:	200 000 cycles
Grade 8:	500 000 cycles
Grade 9:	1 000 000 cycles

Door leaf mass:

Grade 1:	up to 20 kg
Grade 2:	up to 40 kg
Grade 3:	up to 60 kg
Grade 4:	up to 80 kg
Grade 5:	up to 100 kg
Grade 6:	up to 120 kg
Grade 7:	up to 160 kg
Grade 8:	up to 200 kg
Grade 9:	up to 250 kg

Corrosion resistance classification:

Five corrosion grades are identified in accordance with EN 1670:

Grade 0:	no defined corrosion resistance
Grade 1 or A:	mild resistance
Grade 2 or C:	moderate resistance
Grade 3:	high resistance
Grade 4:	very high resistance

Annex C
(normative)

Inspection and maintenance

As fire resisting doorsets and openable windows and smoke control doorsets are frequently operated products carrying a high degree of importance in respect of fire safety in buildings, there should be a duty of care on the building owner to keep all such doors and windows in full operational condition. They should be inspected on a regular basis (normally determined by national regulatory requirements). It is recommended that at least the following be given in the manufacturer's maintenance instructions and should be checked on a regular basis:

- inspect and operate the doorset or openable window to ensure that all the components are in a satisfactory working condition;
- ensure that the lock/latch keeps are free from obstruction;
- check that the door closer speed is controlled within the limits shown in the manufacturer's instructions;
- self closing should be effective from at least an angle of 10° (30° where uncontrolled door closers are in use) opening and override any latch and/or seals fitted;
- check that no devices have been added or removed that would affect the operation of the doorset;
- check that all components are securely fixed and that any seals and/or gaskets are still intact.

It is also recommended that at least the following additional advice is provided to accompany the manufacturer's product maintenance instructions:

- it is the responsibility of the building owner to ensure that any damage or impairment of performance observed during the life time of the installation which could be detrimental to the satisfactory performance of a fire resisting doorset or openable window or smoke control doorset is repaired immediately.
- particular care shall be given to the regular inspection and routine maintenance requirements for intumescent seals and gaskets to ensure their continued mechanical durability and their continued durability against degradation from weathering, chemical, or biological attack.
- it is the responsibility of the building owner to ensure that the prescribed programme of maintenance, as specified by the manufacturer, is completed.
- it is recommended that self closing doorsets or openable windows which are normally held open should have their self closing capability tested at least at the same frequency as the fire alarm system for the building in which they are installed.

Annex D
(normative)

Glass products to be incorporated in fire resisting doorsets and openable windows and/or medium temperature smoke control doorsets

Any glass products to be incorporated in fire resisting doorsets and openable windows shall be declared to conform to the relevant European technical glass product specification. A list of relevant standards is given in Table D.1.

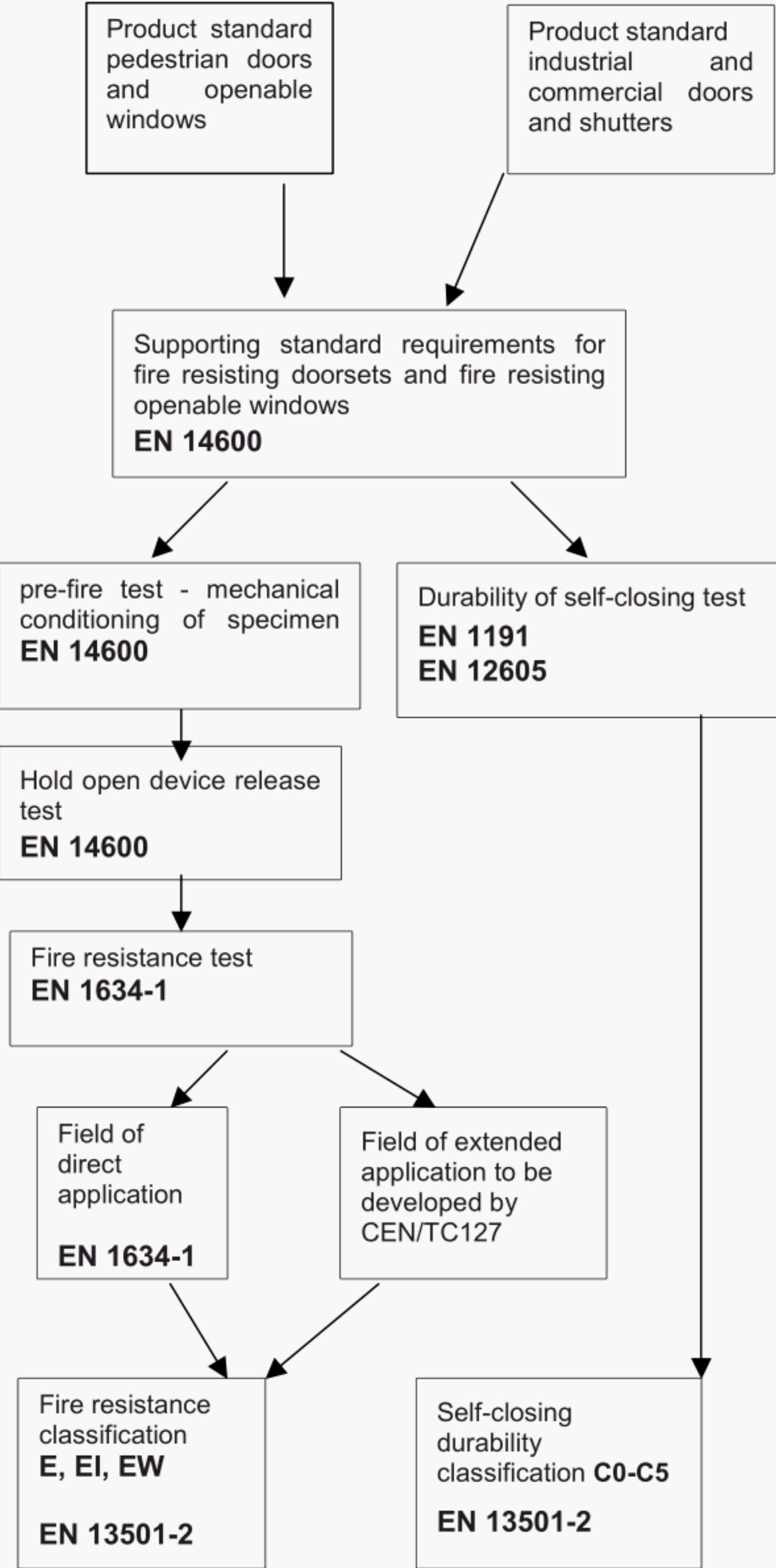
Table D.1 — List of glass product standards that allow glass to be declared fire resistant

Number	Year	Title
EN 572-9	2004	Glass in building – Basic soda lime silicate glass products – Part 9: Evaluation of conformity/Product standard
EN 1096-4	2004	Glass in building – Coated glass – Part 4: Evaluation of conformity/Product standard
EN 1279-5	2001	Glass in building – Insulating glass units – Part 5: Evaluation of conformity/Product standard
EN 1748-1-2	2004	Glass in building – Special basic products – Part 1-2: Borosilicate glass – Evaluation of conformity/Product standard
EN 1748-2-2	2004	Glass in building – Special basic products – Part 2-2: Glass ceramics – Evaluation of conformity/Product standard
EN 1863-2	2004	Glass in building – Heat strengthened soda lime silicate glass – Part 2: Evaluation of conformity/Product standard
EN 12150-2	2004	Glass in building – Thermally toughened soda lime silicate safety glass – Part 2: Evaluation of conformity/Product standard
EN 12337-2	2004	Glass in building – Chemically strengthened soda lime silicate glass – Part 2: Evaluation of conformity/Product standard
EN 13024-2	2004	Glass in building – Thermally toughened borosilicate safety glass – Part 2: Evaluation of conformity/Product standard
prEN 14449	2002	Glass in building – Laminated glass and laminated safety glass: Evaluation of conformity/Product standard
EN 14179-2	2001	Glass in building – Heat soaked thermally toughened soda lime silicate safety glass – Part 2: Evaluation of conformity/Product standard
EN 14178-2	2004	Glass in building – Basic alkaline earth silicate glass products – Part 2: Evaluation of conformity/Product standard
prEN 14321-2	2001	Glass in building – Thermally toughened alkaline earth silicate safety glass – Part 2: Evaluation of conformity/Product standard

NOTE EN 357 may be used as a classification reference specific to fire resistant glass, but is not applicable to glazed elements (see 4.5).

Annex E
(informative)

Route to classification for fire resisting doorsets and fire resisting openable windows



Product standards:

- performance characteristics:
- evaluation of conformity
- packaging and labelling
- CE marking requirements

Supporting standard:

Specific requirements and classification for fire resisting doorsets and fire resisting openable windows

Cyclic testing requirements performed in accordance with:

EN 1191 – windows and pedestrian doors
EN 12605 – industrial, commercial and garage doors and gates

Hold open device release test

Fire resistance test

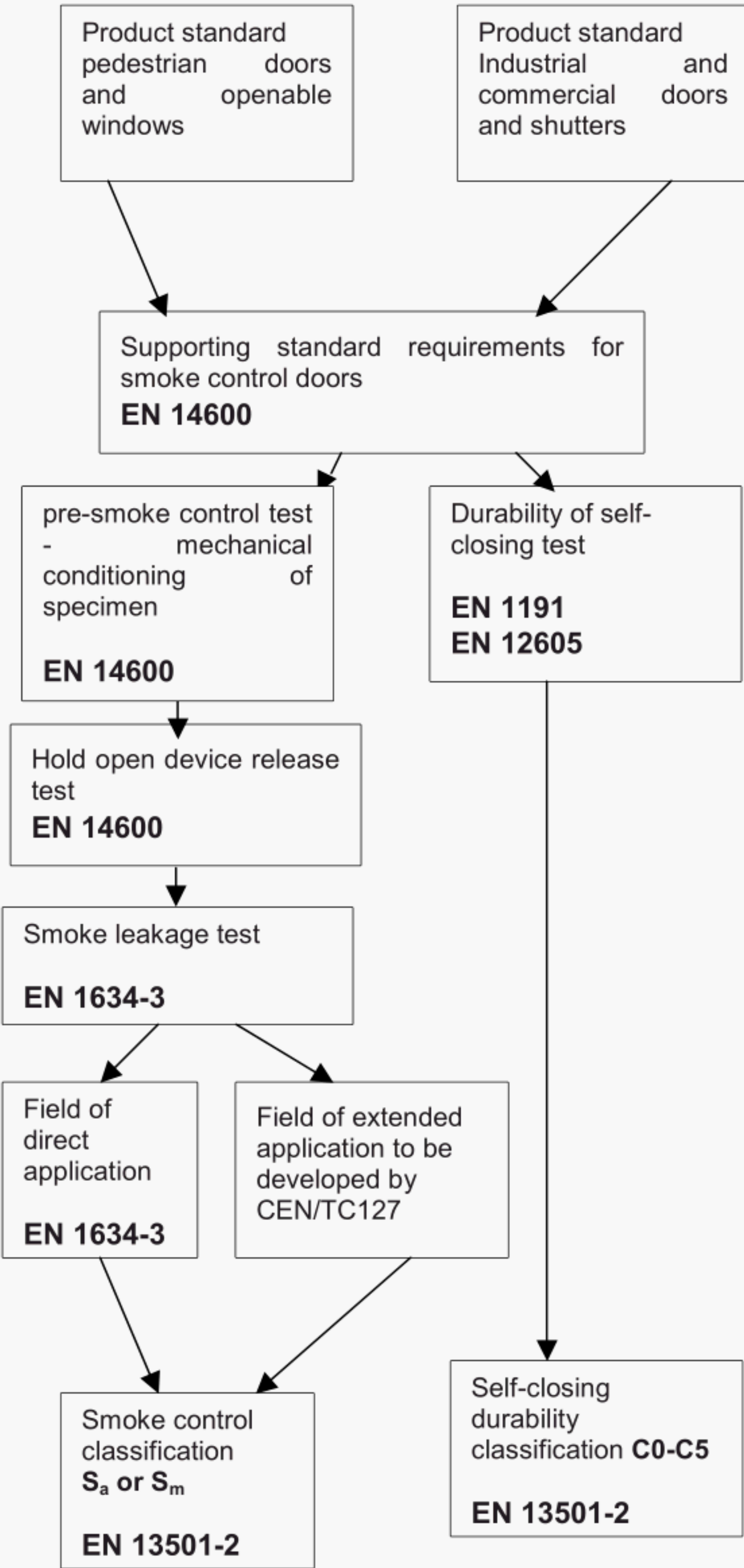
Products to be in accordance with the field of direct application from EN 1634-1, or to meet the extended application requirements when these standards become available.

European classification using data from fire resistance and self-closing durability tests

basic requirement for - evaluation of conformity

Annex F
(informative)

Route to classification for smoke control doorsets



Product standards:

- performance characteristics:
- evaluation of conformity
- packaging and labelling
- CE Marking requirements

Supporting standard:

Specific requirements and classification for smoke control doors

Cyclic testing requirements performed in accordance with:

EN 1191 – windows and pedestrian doors

EN 12605 – industrial, commercial and garage doors and gates

Hold open device release test

Smoke leakage test

Products to be in accordance with the field of direct application from EN 1634-3, or to meet the extended application requirements on a national basis when these standards become available.

European classification using basic requirement for evaluation of conformity

Bibliography

- [1] EN 54-5, *Fire detection and fire alarm systems – Part 5: Heat detectors – Point detectors*
- [2] EN 357, *Glass in building – Fire resistant glazed elements with transparent or translucent glass products – Classification of fire resistance*
- [3] EN 1670, *Building hardware – Corrosion resistance – Requirements and test methods*
- [4] EN 13241-1, *Industrial, commercial and garage doors and gates – Product standard – Part 1: Products without fire resistance or smoke control characteristics*
- [5] prEN 14351-1, *Windows and pedestrian doorsets – Product standard, performance characteristics - Part 1: Windows and external pedestrian doorsets without resistance to fire and smoke leakage characteristics but including external fire performance for roof windows*
- [6] prEN 14351-2, *Internal pedestrian doors - Product Standard - Part 2: Internal pedestrian doorsets without resistance to fire characteristics*
- [7] prEN 14351-3, *Windows and pedestrian doorsets - Product standard, performance characteristics - Part 3: Product with resistance to fire and smoke leakage characteristics*