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del: Zastekljena konstrukcija**

Extended application of results from fire resistance tests - Non-loadbearing walls - Part 4:
Glazed construction

Erweiterter Anwendungsbereich der Ergebnisse aus Feuerwiderstandsprüfungen -
Nichttragende Wände - Teil 4: Verglaste Konstruktionen

Application étendue des résultats d'essais de résistance au feu - Murs non porteurs -
Partie 4 : Constructions vitrées

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Extended application of results from fire resistance tests - Non-loadbearing walls - Part 4: Glazed constructions

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Erweiterter Anwendungsbereich der Ergebnisse von Feuerwiderstandsprüfungen - Nichttragende Wände - Teil 4: Verglaste Konstruktionen

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Foreword

This document (EN 15254-4:2008) has been prepared by Technical Committee CEN/TC 127 “Fire safety in buildings”, the secretariat of which is held by BSI.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 89/106.

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of an identical text or by endorsement, at the latest by August 2008, and conflicting national standards shall be withdrawn at the latest by August 2008.

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EN 15254-4:2008 (E)**1 Scope**

This European standard provides guidance and, where appropriate, defines procedures for variations of certain parameters and factors associated with the design of fire resistant glazed elements which have been tested in accordance with EN 1364-1, and classified according to EN 13501-2.

Extended application of fire resistant glazed elements shall be based on test evidence.

This standard only applies to vertically installed fire resistant glazed elements.

This standard does not apply to doorsets and openable windows according to EN 1634-1.

Glass block assemblies and paver units and channel-shaped glass as defined in EN 1051-1 and EN 572-7 are excluded. There is currently insufficient information available to enable rules for extended application to be developed for these products.

NOTE Some partition walls use a combination of fire resistant glass, non-translucent and other opaque products. The extended application in this case only covers the glass when it replaces these products – see clause 8.2.

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 357:2004, *Glass in building — Fire resistant glazed elements with transparent or translucent glass products — Classification of fire resistance*

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EN 1363-1:1999, *Fire resistance tests — Part 1: General requirements*

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

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

EN 1995-1-2, *Eurocode 5: Design of timber structures - Part 1-2: General - Structural fire design*

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

3 Terms and definitions

For the purposes of this document the terms and definitions given in EN 357:2004 and EN 13501-2, together with the following apply.

3.1**fire resistant glass**

glass product group, monolithic, multiple layers or insulating glass unit, when used in a fire resistant glazed element, can be classified in accordance with EN 13501-2

NOTE 1 The glass can be classified for the purposes of CE marking according to the glass product group determined by the glass manufacturer and tested as a virtual assembly. Classification of fire resistant glass is a mandated requirement within the European Community.

NOTE 2 The term “insulating” when used as an insulating glass unit according to EN 1279–1, should not be confused with the term “insulation” used in EN 13501–2 classification standard for fire resistant glazed element.

3.2**glazing system**

fire resistant glass and glazing materials used in the fire resistance test to glaze the glass into its framing system, e.g. glazing strips, beads and bead fixings, setting blocks, gaskets, sealant (see Figure B.1)

3.3**glazing materials**

all materials used to glaze the fire resistant glass into its frame, e.g. glazing strips, beads and bead fixings, setting blocks, gaskets and sealant (see Figure B.1)

3.4**framing system**

frame profile and fixings to the supporting structure (e.g. wall) (see Figure B.1)

3.5**reference test**

fire resistance test in accordance with EN 1364-1, on which the extended application is based and the results, which are used as the main source of data for the extended application

NOTE 1 This test may also be used as the initial type test to support CE marking of fire resistant glass or as a market application test.

NOTE 2 The reference test provides the main source of data to determine the following:

- fire performance classification (integrity E, integrity with radiation EW or integrity with insulation EI);
- maximum pane area and dimensions for the fire resistant glass;
- maximum dimensions of the fire resistant glazed element for each type of frame material.

The reference test may also provide other data to assist in determining the following:

- permitted dimensional changes to the framing system;
- changes to the glazing system.

3.6**overrun time**

time of fire resistance in minutes beyond the classification time achieved in the reference test, which is the subject of the extended application. The overrun time in the reference test only applies to dimensional changes to the glass and the glazed element. It does not apply to changes to the glazing beads, materials and glazing strips

3.7**previously existing test data**

test data generated by fire resistance tests that have been undertaken by an accredited and/or Notified Test Laboratory in accordance with European and/or former and current national standards based on the temperature-time curve identical to the one specified in EN 1363-1 (and defined in ISO 834). Previously existing test data is acceptable even though the test may not have been carried out using the plate thermometer. This data can only be used as described in this standard

NOTE Previously existing test data is acceptable provided that there has been no change to the product since this data was generated.

3.8**glass product group**

different fire resistant glasses combined in a group, defined and produced by the same manufacturer and described in their product description together with a complete list of all components used in the assembly

NOTE The manufacturers product description should contain all relevant properties required for CE marking.

EN 15254-4:2008 (E)**3.9****char rate**

as defined in EN 1995-1-2

3.10**characterisation**

process in which the limits of the glazing and framing system are separately defined. It shall be based on the reference test and supported by previously existing test data where appropriate

3.11**fire performance classification**

classification of the fire resistant glazed element in accordance with EN 13501-2 with respect to integrity E, radiation W and insulation I

NOTE In previously existing test data the fire resistance is given by time to failure (not by fire performance classification above) in terms of integrity, integrity and insulation. The test data may also contain information concerning the measurement of radiation.

4 Principles**4.1 General principles**

Extended application is a prediction of the expected fire resistance of fire resistant glazed elements. It may be based on interpolation between or extrapolation from test data. The fundamental consideration shall be that the fire resistant glazed element after extension would achieve the required fire performance if it were to be tested according to EN 1364-1.

The specific principles and methodology governing the extended application for fire resistant glazed elements are given in Figure 1.

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Fire resistant glazed elements function as an integral system in which the individual components (glass panes, glazing materials, frames and frame fixings) are combined in such a way that they are effective in meeting the defined fire resistance criteria. However, in this document fire resistant glazed elements are separately characterised as the glazing system and the framing system (see Figure B.1).

4.2 Use of test evidence**4.2.1 General**

The applicant for the extended application shall either be the "owner" (i.e. sponsor) of all reference test and previously existing test data being submitted for the extension, or have written permission from the owner to use the submitted test evidence.

4.2.2 Use of previously existing test data

Previously existing test data may be used to support extended application, for instance to evaluate the influence of a particular component (e.g. glazing material) or aspect of the design (e.g. direction of fire exposure) or to establish which design variations affect the performance in the most or least onerous way. If this can be identified, then a reference test on the most onerous design may be undertaken. If the product achieves the required classification then the other less onerous variations will be covered. The relevant clauses state when previously existing test data may be used.

The following parameters and factors are considered in this standard:

Table 1 — Parameters, Factors and Rules for glazing and framing systems and glazed elements

Parameter	Factor	Rule see clauses:
<u>Glazing system</u>		
Change of glass type and thickness	Replacement of glasses within the same glass product group	6.1
Symmetry of the glass construction	Symmetric / asymmetric glasses	6.2
Rectangular panes	Increase in pane area and aspect ratio	6.3
Circular and three- and (non-rectangular) four-sided glass panes	Increase in area	6.4
Glass panes with EW classification	Increase in area	6.5
Timber beads	Exchange of timber species / bead fixing / bead shape and dimensions	6.6
Metal beads	Exchange of bead fixing / bead shape and dimensions	6.7
Exchange of glazing materials	Gaskets/glazing strips / setting blocks	6.8
Bead surface coverings	Changes or adding surface coverings	6.9
<u>Framing system</u>		
Symmetry of the framing construction	Symmetrical / asymmetrical frames	7.1
Exchange of frames (general)	Type of material / junction types / edge cover	7.2.1
Timber frames	Thickness / profile / timber type (char rate / density)	7.2.2
Metal frames	Frame materials / sections / thickness of chamber walls	7.2.3
Frame surface covering	Changes or adding frame surface coverings	7.3
Supporting construction and fixing	High density, low density, rigid, flexible	7.4
<u>Fire resistant glazed element</u>		
Glazed elements classified to E or EI	Increase in dimensions / area	8.1
Glazed element classified EW	Increase in dimensions / area	8.2
	Replication of whole element with EW classification	8.3
Installation angle	Change in installation angle	8.4

Step 1 : Define the fire-resistant glazed element which is under consideration for EXAP
- e.g. by detailed drawings, component description and specification



Step 2 : Characterise the fire performance limits of the Glazing System and Framing System
- e.g. by reference test(s) in accordance with EN 1364-1, and where

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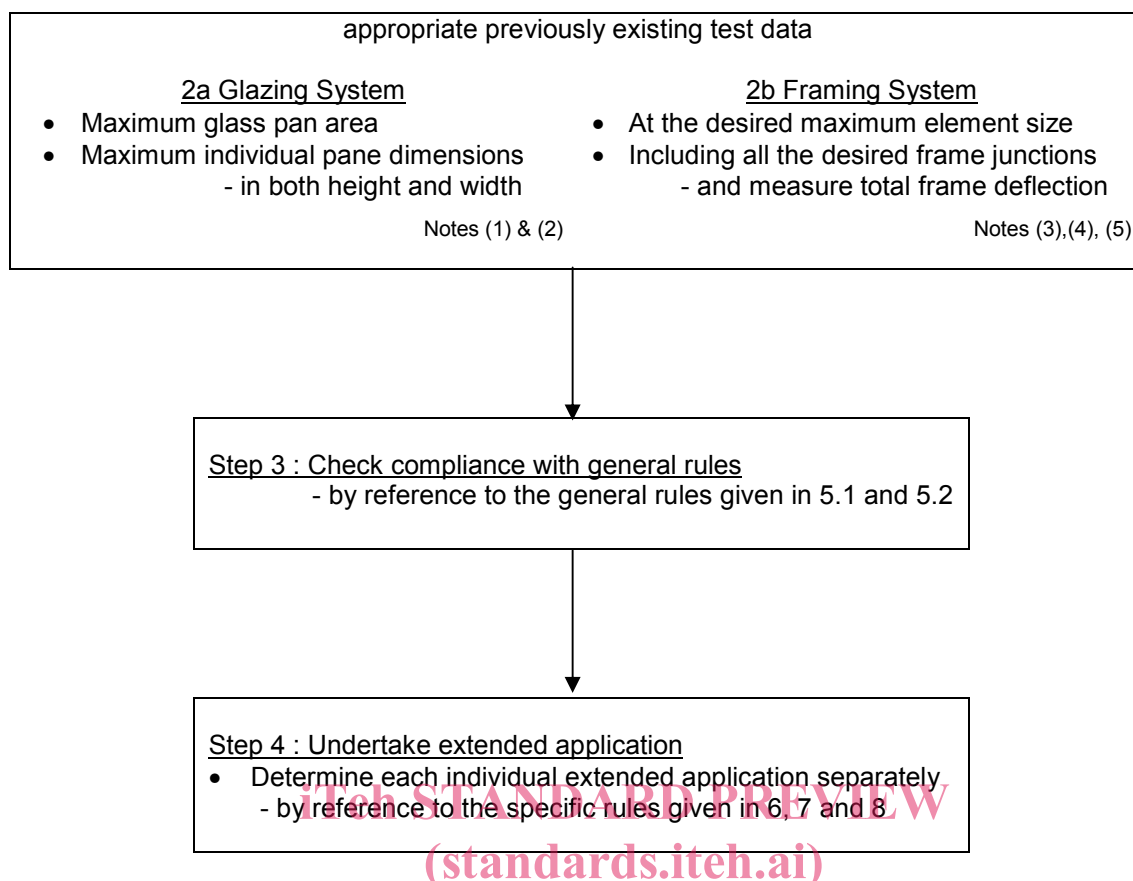


Figure 1 — Methodology for determining the extended application of fire resistant glazed elements

4.2.3 Notes for Methodology in Figure 1

- 1: Define glass, bead type, fixings and glazing material, etc.
- 2: Maximum dimensions not necessarily established in the same pane (e.g. maximum height, maximum width, maximum area). It is not allowed to combine dimensions from different panes.
- 3: Frame type to be the same as step 2a (e.g. material specification and fire performance).
- 4: Bead, fixing, glass and glazing material have to be the same as those in step 2a.
- 5: When the fire resistant glazed element to be considered is greater than 3 m × 3 m then the fire resistance test specimen has to be a minimum of 3 m × 3 m.

5 General rules

5.1 Fire performance classification

In the extended application, an increase in the classification time (e.g. from 30 min to 45 min) and changes to the fire performance classification (e.g. from E to EW to EI) shall not be permitted.

5.2 Combination of extended application

Each extended application shall be the subject of a separate evaluation. Within this application it is allowed to produce a combination of extensions provided these combinations can be substantiated by the supporting test evidence and/or previously existing test data (see Annex A for an example).

An extended application that has already been granted can be used for a new extended application provided it can be shown that the new changes do not contradict any of the principles used to establish the first extended application.

NOTE For reasons of traceability all supporting documents used for any extension should be included in the EXAP report.

5.3 Reference Test

The basis for any extension is the reference test. This test is used for the extended application and must have an overrun time according to the rules described in clause 6 and clause 8 of this standard. A reference test can be submitted for either rectangular or non rectangular panes.

NOTE 1 Non rectangular glass panes do not need their own reference test if they are cut out from within the rectangular pane covered by the reference test. The rectangular pane can be extended according to the rules given in this standard before cutting takes place. Circular, triangular or 4 sided shapes can then be cut from within this extended rectangular size. All other non irregular shapes, can only be cut from the tested original sized rectangular pane (According to the Direct Field of Application rules of EN 1364-1). These shapes cannot be further extended.

NOTE 2 In the case of the reference test in which a number of glass panes of different sizes and aspect ratios have been tested in a glazed construction, the extension in any dimension or area is only applicable to a single pane. For example, for a rectangular pane of height $H_1 = 2000$ mm and width $B_1 = 1500$ mm and another pane of height $H_2 = 2500$ mm and width $B_2 = 1000$ mm it is not allowed to apply an extension to a hypothetical pane of height $H_2 = 2500$ mm and width $B_1 = 1500$ mm because the area before extension is greater than either of the tested panels and the aspect ratio is not equivalent to either of the tested panels.

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6 Specific changes to the glazing system

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6.1 Exchange of the fire resistant glass

The exchange (replacement) of the glass, as tested in the reference test, for another fire resistant glass is allowed, provided that it can be demonstrated that both glasses are within the same glass product group (same manufacturer) and have at least the same or increased nominal thickness.

When the reference glass is being exchanged (replaced), the replacement glass (new glass) must have evidence that it achieves at least the same fire resistance classification (or equivalent fire resistance) as the reference glass (such as previously existing test data).

If the replacement glass was tested (previously existing test data) at a smaller or the same size/area as in the reference test (before extension) then the size/area of the replacement glass cannot be changed from its tested size/area.

If the replacement glass was tested at the same size/area as in the reference test (after extension) then this size/area of replacement glass can be used to replace the reference glass.

If the replacement glass was tested at a larger size/area than in the reference test (after extension) then the maximum size/area of the replacement glass can be no greater than the extended size/area of the glass as tested in the reference test.

When making an exchange of one glass for a thicker glass from the same glass product group (same manufacturer), the structural stability of the whole glazed element must be maintained.

NOTE When exchanging one EI glass for another EI glass the transmission/absorption values only marginally influence the fire resistance performance of the glass. It is the incorporation of one or more special interlayer(s) that governs the fire resistance not the type of glass used.

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6.2 Asymmetrical fire resistant glass

Fire resistance test evidence shall be provided for exposure to fire from both directions unless it can be determined which direction is the worst case. If this can be established by the use of previously existing test data then only fire resistance test evidence for the worst case is required.

In the absence of such test evidence the fire resistant glass shall only be used in the orientation in which it was tested.

Fire resistant glass that has a surface coating on one surface is considered to be asymmetrical and therefore the above rules shall apply.

NOTE To demonstrate that the fire performance classification is not affected by the direction of exposure, a reference test and/or supporting previously existing test data will be required.

6.3 Individual rectangular glass panes: aspect ratio and increase in area

An increase in the glass width, height and area is only allowed provided the length of overrun time in the reference test is as shown in Table 2 below.

Table 2 — Required Overrun time on rectangular glass panes

Classification Time (min)	Overrun required
≤ 20	At least 3 min
30 and 45 and 60	At least 6 min ^a
≥ 90	At least 10 % of the classification time ^a

^a For overrun times between 3 min and 6 min or 5 % and 10 % see explanations below (after the equations 1 to 3).

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The basis for the extension is the reference test.

The width or height may be increased in accordance with equations 1 or 2 respectively. Where both width and height are increased the maximum extended area shall be in accordance with equation 3.

$$w_{\text{ext}} \leq w_{\text{max}} = w_o \times 1,20 \quad (1)$$

$$h_{\text{ext}} \leq h_{\text{max}} = h_o \times 1,20 \quad (2)$$

$$A_{\text{ext}} \leq A_{\text{max}} = A_o \times 1,21 \quad (3)$$

where

w_o , h_o , A_o is the width (m), height (m) and area (m²) of the tested pane;

w_{ext} , h_{ext} , A_{ext} is the extended width (m), height (m) and area (m²) of pane;

w_{max} , h_{max} , A_{max} is the maximum extended width (m), height (m) and area (m²) of pane.

For the classification times 30 min, 45 min and 60 min, if the overrun time achieved in the reference test is 3 min or more but less than 6 min, all glass extensions in width, height and area can be increased according to equations 1 to 3. However, the increase in any dimension is restricted to a maximum of 50 % of the calculated increase using these equations.

For the classification times ≥ 90 min, if the overrun time achieved in the reference test is 5 % or more but less than 10 %, all glass extensions in width, height and area can be increased according to equations 1 to 3. However, the increase in any dimension is restricted to a maximum of 50 % of the calculated increase using these equations.