BS EN ISO 12543-2:2011

BSI Standards Publication

Glass in building — Laminated glass and laminated safety glass

Part 2: Laminated safety glass (ISO 12543-2:2011)

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National foreword

This British Standard is the UK implementation of EN ISO 12543-2:2011. It supersedes BS EN ISO 12543-2:1998 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/520/1, Basic and transformed glass products.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

ISBN 978 0 580 60142 2

ICS 81.040.20

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 August 2011.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 12543-2

August 2011

ICS 81.040.20

Supersedes EN ISO 12543-2:1998

English Version

Glass in building - Laminated glass and laminated safety glass - Part 2: Laminated safety glass (ISO 12543-2:2011)

Verre dans la construction - Verre feuilleté et verre feuilleté de sécurité - Partie 2: Verre feuilleté de sécurité (ISO 12543-2:2011)

Glas im Bauwesen - Verbundglas und Verbund-Sicherheitsglas - Teil 2: Verbund-Sicherheitsglas (ISO 12543-2:2011)

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Ref. No. EN ISO 12543-2:2011: E

Foreword

This document (EN ISO 12543-2:2011) has been prepared by Technical Committee ISO/TC 160 "Glass in building" in collaboration with Technical Committee CEN/TC 129 “Glass in building” the secretariat of which is held by NBN.

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of an identical text or by endorsement, at the latest by February 2012, and conflicting national standards shall be withdrawn at the latest by February 2012.

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.

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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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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The text of ISO 12543-2:2011 has been approved by CEN as a EN ISO 12543-2:2011 without any modification.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 12543-2 was prepared by Technical Committee ISO/TC 160, *Glass in building*, Subcommittee SC 1, *Product considerations*.

This second edition cancels and replaces the first edition (ISO 12543-2:2004), which has been technically revised.

ISO 12543 consists of the following parts, under the general title *Glass in building — Laminated glass and laminated safety glass*:

— *Part 1: Definitions and description of component parts*

— *Part 2: Laminated safety glass*

— *Part 3: Laminated glass*

— *Part 4: Test methods for durability*

— *Part 5: Dimensions and edge finishing*

— *Part 6: Appearance*

INTERNATIONAL STANDARD **ISO 12543-2:2011(E)**

Glass in building — Laminated glass and laminated safety glass —

Part 2: Laminated safety glass

1 Scope

This part of ISO 12543 specifies performance requirements for laminated safety glass as defined in ISO 12543-1.

2 Normative references

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

ISO 12543-1, *Glass in building — Laminated glass and laminated safety glass — Part 1: Definitions and description of component parts*

ISO 12543-4:2011, *Glass in building — Laminated glass and laminated safety glass — Part 4: Test methods for durability*

ISO 12543-5, *Glass in building — Laminated glass and laminated safety glass — Part 5: Dimensions and edge finishing*

ISO 12543-6, *Glass in building — Laminated glass and laminated safety glass — Part 6: Appearance*

EN 12600, *Glass in building — Pendulum test — Impact test method and classification for flat glass*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12543-1 and the following apply.

3.1
delamination
usually a two-dimensional visual effect which is caused by local loss of adhesion between the glass or plastic glazing material and the interlayer

NOTE Local total loss of adhesion between the glass or plastic glazing material and the interlayer leads to a local increase of light reflection.

3.2
bubble
usually a three-dimensional visual effect which is caused by gaseous inclusions in the interlayer or at the interface between glass and interlayer

3.3
haze
scattering of incident light by a specimen resulting in a reduction of direct light transmittance and the contrast of objects viewed through the glass

3.4
cloudiness
local variation in the scattering of incident light by a specimen resulting in a reduction of direct light transmittance and the contrast of objects viewed through the glass

3.5
discoloration
significant change of colour of a laminated safety glass, caused by oxidization processes in the interlayer

NOTE In clear interlayers, discoloration is usually perceived as yellowing.

4 Impact resistance

Laminated safety glass is distinguished from laminated glass by its performance under a pendulum impact test and its subsequent classification.

NOTE ISO/TS 29584, detailing two methods of pendulum impact testing, is available. The publication of an International Standard on impact testing and classification of glass products is expected in the future.

In the absence of an appropriate International Standard for impact testing glass products, the following applies:

— in non-CEN ISO member states, laminated safety glass should be classified in accordance with appropriate national standards or EN 12600;

— in CEN member states, laminated safety glass should be classified to a minimum of 3(B)3 in accordance with EN 12600.

5 Durability of laminated safety glass and laminated safety glass with fire-resistant properties

5.1 High-temperature test

5.1.1 General

Durability of laminated safety glass is dependent upon the following factors:

— interlayer type;

— presence of plastic glazing sheet materials;

— presence of encapsulated materials.

The choice of test method is dependent upon the above-mentioned factors.

Laminated safety glass not incorporating plastic glazing sheet materials shall be tested in accordance with 5.1.2.

Laminated safety glass incorporating plastic glazing sheet materials and/or encapsulated materials shall be tested in accordance with 5.1.3.

NOTE A manufacturer can choose to test laminated safety glass incorporating encapsulated materials in accordance with 5.1.2.

5.1.2 Laminated safety glass that does not include plastic glazing materials

Laminated safety glass shall be tested in accordance with ISO 12543-4:2011, 5.3.2, and evaluated in accordance with ISO 12543-4:2011, 5.4. No fault (i.e. bubbles, delamination, haze or cloudiness) shall be found in three test specimens.

If faults are found in only one test specimen, three new test specimens shall be tested in accordance with ISO 12543-4:2011, 5.3.2, and evaluated in accordance with ISO 12543-4:2011, 5.4. No fault shall be found in any of these three test specimens.

5.1.3 Laminated safety glass that includes plastic glazing materials and/or encapsulated material

Laminated safety glass shall be tested in accordance with ISO 12543-4:2011, 5.3.3, and evaluated in accordance with ISO 12543-4:2011, 5.4. No fault (i.e. bubbles, delamination, haze or cloudiness) shall be found in three test specimens.

If faults are found in only one test specimen, three new test specimens shall be tested in accordance with ISO 12543-4:2011, 5.3.3, and evaluated in accordance with ISO 12543-4:2011, 5.4. No fault shall be found in any of these three test specimens.

5.2 Humidity test

Laminated safety glass shall be tested in accordance with ISO 12543-4:2011, 6.3.1, and evaluated in accordance with ISO 12543-4:2011, 6.4. No fault (i.e. bubbles, delamination, haze or cloudiness) shall be found in three test specimens.

If faults are found in only one test specimen, three new test specimens shall be tested in accordance with ISO 12543-4:2011, 6.3.1, and evaluated in accordance with ISO 12543-4:2011, 6.4. No fault shall be found in any of these three test specimens.

5.3 Radiation test

Laminated safety glass shall be tested in accordance with ISO 12543-4:2011, Clause 7, and evaluated in accordance with ISO 12543-4:2011, 7.5.1. The luminous transmittance of three irradiated test specimens shall not change by more than

a) ±3 % of their value before exposure for initial light transmittances of greater than 65 %, or

b) ±2 % of their absolute value for initial light transmittances of less than or equal to 65 %.

When visually inspected, no fault (i.e. bubbles, delamination, haze or cloudiness) shall be found in the three irradiated test specimens.

If faults are found in only one test specimen, three new test specimens shall be tested in accordance with ISO 12543-4:2011, Clause 7, and evaluated in accordance with ISO 12543-4:2011, 7.5.1. No fault shall be found in any of these three test specimens.

6 Durability of fire-resistant laminated safety glass

6.1 General

The durability of fire-resistant laminated safety glass is dependent upon its exposure to direct solar radiation.

NOTE 1 Fire-resistant laminated safety glass glazed externally is subject to direct solar radiation.

NOTE 2 Fire-resistant laminated safety glass glazed internally is not normally subject to direct solar radiation.

Fire-resistant laminated safety glass not normally exposed to direct solar radiation shall comply with 6.2.

Fire-resistant laminated safety glass normally exposed to direct solar radiation shall comply with 6.3.

6.2 Humidity test for glass that is not normally exposed to direct solar radiation

Fire-resistant laminated safety glass shall be tested in accordance with ISO 12543-4:2011, 6.3.2, and evaluated in accordance with ISO 12543-4:2011, 6.4. No delamination shall be found in three test specimens.

If delamination is found in only one test specimen, three new test specimens shall be tested in accordance with ISO 12543-4:2011, 6.3.2, and evaluated in accordance with ISO 12543-4:2011, 6.4. No fault shall be found in any of these three test specimens.

6.3 Tests for glass that is normally exposed to direct solar radiation

6.3.1 Humidity test

Fire-resistant laminated safety glass shall be tested in accordance with ISO 12543-4:2011, 6.3.1, and evaluated in accordance with ISO 12543-4:2011, 6.4. No delamination shall be found in three test specimens.

If delamination is found in only one test specimen, three new test specimens shall be tested in accordance with ISO 12543-4:2011, 6.3.1, and evaluated in accordance with ISO 12543-4:2011, 6.4. No fault shall be found in any of these test specimens.

6.3.2 Radiation test

Fire-resistant laminated safety glass shall be tested in accordance with ISO 12543-4:2011, Clause 7, and evaluated in accordance with ISO 12543-4:2011, 7.5.2. No delamination shall be found in three test specimens.

If delamination is found in only one test specimen, three new test specimens shall be tested in accordance with ISO 12543-4:2011, Clause 7, and evaluated in accordance with ISO 12543-4:2011, 7.5.2. No fault shall be found in any of these test specimens.

7 Component parts

The description of component parts of laminated safety glass shall be as given in ISO 12543-1.

8 Dimensions and edge finishing

The dimensions and edge finishing of laminated safety glass shall be in accordance with ISO 12543-5.

9 Acoustic properties test

The acoustic properties of the laminated safety glass may be tested in accordance with ISO 22897.

The acoustic properties of the interlayer may be tested according to ISO 16940.

The loss factor for the first mode may be defined when tested according to ISO 16940.

NOTE From the values obtained by the method in ISO 16940, it is possible to calculate R_w and $R_w + C_{tr}$ ratings of laminated glazing according to ISO 22897 or EN 12758.

10 Appearance

The appearance of laminated safety glass shall be in accordance with ISO 12543-6.

11 Designation

Laminated safety glass shall be designated by:

— type;

— reference to this part of ISO 12543;

— nominal thickness, in millimetres;

— nominal width, B, and nominal length, H, in millimetres.

EXAMPLE A fire-resistant laminated safety glass with a thickness of 6,4 mm, a width of 2,0 m and a length of 1,50 m is designated as follows:

Fire-resistant laminated safety glass ISO 12543-2 - 6,4 - 2000 x 1500

Bibliography

[1] ISO 16940, *Glass in building — Glazing and airborne sound insulation — Measurement of the mechanical impedance of laminated glass*

[2] ISO 22897, *Glass in building — Glazing and airborne sound insulation — Product descriptions and determination of properties*

[3] ISO/TS 29584, *Glass in building — Technical Specification — Pendulum impact testing and classification of safety glass for use in buildings*[1)]

[4] EN 12758, *Glass in building — Glazing and airborne sound insulation — Product descriptions and determination of properties*

Examples of standards specifying impact test methods suitable for classifying laminated safety glass in non-CEN member states which are members of ISO

[5] AS/NZS 2208, *Safety glazing materials in buildings*

[6] CAN/CGSB-12.1-M90, *Tempered or laminated safety glass*

[7] JIS R 3205, *Laminated glass*

[8] ANSI Z97.1, *Safety Glazing Materials Used in Buildings — Safety Performance Specifications and Methods of Test (includes errata)*

[9] CPSC 16 CFR 1201, *Safety Standard For Architectural Glazing Materials*

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