
**Glass in building — Laminated glass and
laminated safety glass —**

**Part 6:
Appearance**

*Verre dans la construction — Verre feuilleté et verre feuilleté de sécurité —
Partie 6: Aspect*
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Foreword

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

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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International Standard ISO 12543-6 was prepared by the European Committee for Standardization (CEN) in collaboration with ISO Technical Committee TC 160, *Glass in building*, Subcommittee SC 1, *Product consideration*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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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*

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Contents

	page
Foreword	iv
1 Scope	1
2 Normative references	1
3 Definitions	1
3.1 spot defects	1
3.2 linear defects	1
3.3 other defects	1
3.4 opaque spots	1
3.5 bubbles	1
3.6 foreign bodies	
3.7 scratches or grazes	
3.8 vents	
3.9 creases	
3.10 streaks due to interlayer inhomogeneity	
4 Defects in the visual area	
4.1 Spot defects in the visual area	
4.2 Linear defects in the visual area	
5 Defects in the edge area for framed edges	
6 Vents	
7 Creases and streaks	
8 Defects on edge which will not be framed	
9 Test method	

Foreword

The text of EN ISO 12543-6:1998 has been prepared by Technical Committee CEN/TC 129 "Glass in building", the secretariat of which is held by IBN, in collaboration with Technical Committee ISO/TC 160 "Glass in building".

This part of the standard is one of a series of interrelated parts:

- EN ISO 12543-1: Glass in building - Laminated glass and laminated safety glass - Part 1: Definitions and description of component parts
- EN ISO 12543-2: Glass in building - Laminated glass and laminated safety glass - Part 2: Laminated safety glass
- EN ISO 12543-3: Glass in building - Laminated glass and laminated safety glass - Part 3: Laminated glass
- EN ISO 12543-4: Glass in building - Laminated glass and laminated safety glass - Part 4: Test methods for durability
- EN ISO 12543-5: Glass in building - Laminated glass and laminated safety glass - Part 5: Dimensions and edge finishing
- EN ISO 12543-6: Glass in building - Laminated glass and laminated safety glass - Part 6: Appearance

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 November 1998, and conflicting national standards shall be withdrawn at the latest by November 1998.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This Standard specifies defects of finished sizes and test methods with regard to the appearance when looking through the glass. Special attention is paid to acceptability criteria in the vision area. These criteria apply to products at the time of supply.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

EN ISO 12543-1 Glass in building - Laminated glass and laminated safety glass - Part 1: Definitions and description of component

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

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3 Definitions

For the purposes of this standard the following definitions, together with those of EN ISO 12543-1, apply:

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- 3.1 spot defects:** This type of defect includes opaque spots, bubbles and foreign bodies.
- 3.2 linear defects:** This type of defect includes foreign bodies and scratches or grazes.
- 3.3 other defects:** Glass defects such as vents and interlayer defects such as creases, shrinkage and streaks.
- 3.4 opaque spots:** Visible defects in the laminated glass (for example - tin marks, inclusions in the glass or interlayer).
- 3.5 bubbles:** Usually air bubbles, these can be in the glass or in the interlayer.
- 3.6 foreign bodies:** Any unwanted item introduced into the laminated glass during manufacture.
- 3.7 scratches or grazes:** Linear damage to the outside surface of the laminated glass.
- 3.8 vents:** Sharp tipped fissures or cracks running into the glass from an edge.
- 3.9 creases:** Distortions introduced into the interlayer by folds visible after manufacture.
- 3.10 streaks due to interlayer inhomogeneity:** Distortions in the interlayer, caused by manufacturing defects in the interlayer, which are visible after manufacture.

4 Defects in the vision area

4.1 Spot defects in the vision area

When inspected according to the test method given in clause 9, the admissibility of spot defects depends on the following:

- size of the defect;
- frequency of the defect;
- size of the pane;
- number of panes as components of a laminated glass.

This is expressed in table 1.

Defects less than 0,5 mm are not considered.

Defects greater than 3 mm are not permitted.

NOTE: Admissibility of spot defects in laminated glass is independent of the individual glass thickness.

Table 1: Permissible spot defects in the vision area

Size of defect d in mm		0,5 < d ≤ 1,0		1,0 < d ≤ 3,0		
		(standards.iteh.ai)				
Size of pane A in m ²		for all sizes	A ≤ 1	1 < A ≤ 2	2 < A ≤ 8	A > 8
Number of permissible defects	2 panes	no limitation, however no accumulation of defects	1	2	1/m ²	1,2/m ²
	3 panes		2	3	1,5/m ²	1,8/m ²
	4 panes		3	4	2/m ²	2,4/m ²
	≥ 5 panes		4	5	2,5/m ²	3/m ²

NOTE: An accumulation of defects occurs if four or more defects are at a distance of < 200 mm from each other. This distance is reduced to 180 mm laminated glass consisting of three panes, to 150 mm laminated glass consisting of 4 panes and to 100 mm laminated glass consisting of five or more panes.

The number of permissible defects in table 1 shall be increased by 1 for each individual interlayer which is thicker than 2 mm.

4.2 Linear defects in the vision area

When inspected according to the test method given in clause 9 linear defects are allowed as given in table 2.

Table 2: number of permissible defects in the vision area

Area of pane	Number of permissible defects ≥ 30 mm in length
≤ 5 m ²	not allowed
5 to 8 m ²	1
> 8 m ²	2

Linear defects less than 30 mm in length are allowed.

5 Defects in the edge area for framed edges

When inspected according to the test method given in clause 9, defects which do not exceed 5 mm in diameter are permitted in the edge area. For panes sizes ≤ 5 m² the width of the edge area is 15 mm. The edge area width is increased to 20 mm for pane sizes > 5 m². If bubbles are present, the bubbled area shall not exceed 5 % of the edge area.

6 Vents

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Vents are not permitted.

7 Creases and streaks

These are not allowed in the visual area.

8 Defects on edge which will not be framed

Laminated glass is usually installed in frames; when it is unframed, its edges may be

- ground edges;
- polished edges;
- bevelled edges.

in accordance with EN ISO 12543-5.

In such conditions shells, bubbles, interlayer defects and retractions are permissible if they do not become obvious when subjected to the test method (see clause 9).

9 Test method

The laminated glass to be observed is put in a vertical position, in front of and parallel to a matt grey screen, lit by diffuse daylight or equivalent.

The observer will be at a distance of 2 m from the glass observing it perpendicularly (the matt screen being on the other side of the glass).

Defects that are disturbing when viewed shall be marked.

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