

Glass in building — Mirrors from silver-coated float glass for internal use

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ICS 81.040.20

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National foreword

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 31 and a back cover.

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This British Standard, having been prepared under the direction of the Sector Committee for Building and Civil Engineering, was published under the authority of the Standards Committee and comes into effect on 15 December 1999

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ISBN 0 580 35262 5

Amendments issued since publication

Amd. No.	Date	Comments

English version

Glass in building – Mirrors from silver-coated float glass for internal use

Verre dans la construction – Miroirs en glace argentée pour l'intérieur

Glas im Bauwesen – Spiegel aus silberbeschichtetem Floatglas für den Innenbereich

This European Standard was approved by CEN on 22 March 1999.

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 129 "Glass in building", the Secretariat of which is held by IBN.

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of an identical text or by endorsement, at the latest by October 1999, and conflicting national standards shall be withdrawn at the latest by October 1999.

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 European Standard specifies minimum quality requirements (in respect of optical, visual and edge faults) and durability tests for mirrors from silvered float glass, for internal use in building.

This standard applies only to mirrors from silvered glass manufactured from flat annealed clear or tinted float glass, 2 mm to 6 mm thickness, and supplied in stock/standard sizes and as-cut finished sizes.

This standard does not apply to mirrors from silvered glass manufactured from any basic glass other than float glass, any processed glass, i.e. thermally toughened safety glass, heat strengthened glass, chemically strengthened glass and laminated glass, and any bent glass.

For mirrors from silvered glass used in aggressive and/or constantly high humidity atmospheres, e.g. horse riding halls, swimming pools, medical baths, saunas etc. this standard is not applicable. This standard is not applicable to reflective glass for external glazing applications.

This standard does not apply to framing, fixing or other support systems.

NOTE: Useful advice on these items is contained in the informative annex B.

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 572-1	Glass in building – Basic soda lime silicate glass products – Part 1 : Definitions and general physical and mechanical properties
EN 572-2	Glass in building – Basic soda lime silicate glass products – Part 2 : Float glass
ISO 2409	Paints and varnishes – Cross-cut test
ISO 9227	Corrosion tests in artificial atmospheres – Salt spray tests
ISO 5740	Road vehicles – Rear view mirrors – Test method for determining reflectance

3 Definitions

For the purposes of this standard, the following definitions apply:

3.1 float glass: Flat, transparent, clear or tinted soda-lime silicate glass having parallel and polished faces obtained by continuous casting and flotation on a metal bath. See EN 572-1 and EN 572-2.

3.2 mirror from silver-coated float glass: Flat annealed clear or tinted float glass whose rear surface has been coated with a protected reflective silver deposit.

3.3 stock/standard sizes: Panes of mirrors from silver-coated float glass supplied with as-cut edges which are intended for further processing. For dimensions of jumbo sizes and split sizes see EN 572-2.

3.4 as-cut finished sizes: Finished panes of mirrors from silver-coated float glass cut from stock/standard sizes. They may be subject to further processing, e.g. edgeworking, drilling, face decoration etc.

3.5 optical faults: Faults directly associated with the distortion of the reflected image.

3.6 glass appearance faults: Faults which alter the visual quality of the mirror from silver-coated float glass. They can be spot and/or linear and/or enlarged area faults.

3.7 spot faults: Nuclei (solid or gaseous inclusions), deposits, crush marks etc. In certain instances spot faults are accompanied by a distortion zone called 'halo'. The nucleus of the spot fault is measurable.

3.8 linear defects: Scratches, extended spot faults etc.

3.9 hairline scratches: Very fine circular scratches that can hardly be seen and are associated with glass cleaning techniques.

3.10 reflective silver coating faults: Faults in the reflective silver layer which will alter the appearance of the silvered glass. They consist of scratches, stain, colour spots and edge deterioration.

3.11 stain: Alteration of the reflective coating characterized by a more or less brownish, yellowish or greyish colouration of zones which can sometimes cover the whole reflective surface.

3.12 colour spots: Alteration of the reflective coating in the form of small, generally coloured spots.

3.13 edge deterioration: Discolouration of the reflective silver at the edge of the silvered glass.

3.14 protective coating(s) faults: Faults where the metallic layer is exposed. They can be scratches or loss of adhesion of the protective coating(s).

3.15 edge faults: Faults that affect the as-cut edge of the silvered glass. They can include entrant/emergent faults, shelling, corners on/off and vents.

3.16 pack area: The total surface area of the contents of a pack.

3.17 cluster: A group of not less than three spot faults, separated by not more than 50 mm.

3.18 halo: Distortion zone around a spot fault (see 3.7).

4 Materials

4.1 Glass products

Mirror from silver-coated float glass, according to this standard, shall be manufactured from monolithic float glass conforming to EN 572-2.

4.2 Reflective coating

In order to provide the quality of a silvered mirror reflection, the mirror shall be manufactured with at least 0,7 g/m² of silver.

4.3 Protective coating(s)

The reflective coating described in 4.2 shall be protected by a layer of metallic copper or another material and one or more protective coatings e.g. paint, lacquer etc.

5 Dimensional requirements

5.1 Thickness

The actual thickness shall be the average of four measurements, taken to the nearest 0,01 mm, one taken at the centre of each side. Measurement shall be by means of an instrument of the calliper micrometer type.

The actual thickness, rounded to the nearest 0,1 mm shall not vary from the nominal thickness by more than the tolerances shown in table 1.

Table 1: Thicknesses and tolerances

Nominal thickness (mm)	Thickness tolerances (mm)
2	$\pm 0,2$
3	$\pm 0,2$
4	$\pm 0,2$
5	$\pm 0,2$
6	$\pm 0,2$

5.2 Length, width and squareness

5.2.1 Stock/standard sizes

Length, H , and width, B , are defined with reference to the direction of draw of the float glass ribbon as shown in figure 1.

The nominal dimensions for length, H , and width, B , being given, the pane shall not be larger than a prescribed rectangle resulting from the nominal dimensions increased by the permissible plus tolerance or smaller than a permissible rectangle reduced by the permissible minus tolerance. The sides of the prescribed rectangles shall be parallel to one another and these rectangles shall have a common centre. For stock/standard sizes the tolerances on nominal dimensions length, H , and width, B , are ± 5 mm.

The limits of squareness shall also be described by these rectangles (see figure 2).

5.2.2 As-cut finished sizes

For dimensions less than or equal to 2 000 mm, the standard tolerance range is 2 mm, to be stated as ± 1 mm of the nominal dimension.

For dimensions greater than 2 000 mm, the standard tolerance range is 3 mm to be stated as $\pm 1,5$ mm of the nominal value.

The standard tolerance range to be applied shall be determined by the largest dimension of the pane.

The squareness tolerance shall be expressed as the difference in length between the diagonal dimensions of the pane.

For plates with both dimensions less than or equal to 2 000 mm the difference shall not exceed 3 mm.

For plates with one (or both) dimensions greater than 2 000 mm the difference shall not exceed 4 mm.

NOTE: The method of determining squareness tolerance is different from that applied to standard or stock sizes or in standards for other types of glass products.

6 Reflection characteristics of silvered mirrors

6.1 Measurement

Measurement of reflectance shall be undertaken in accordance with the principle of ISO 5740, but with the angle of incidence of the light within 10° of normal.

6.2 Silvered mirrors made from clear float glass

The regular luminous coefficient of silvered mirrors made from clear float glass shall be at least 83%.

6.3 Silvered mirrors made from tinted float glass

Silvered mirrors made from tinted float glass have a reflectance lower than those made from clear glass.

7 Quality requirements

7.1 General

The quality of a silvered mirror can be affected by faults which alter the appearance of the image of reflected objects.

Such alteration of the image can result from optical faults, faults in the glass and faults in the reflective coating.

7.2 Quality assessment and inspection methods for silvered mirrors

7.2.1 Glass, reflective coating, edge and protective coating quality

7.2.1.1 Inspection method

The silvered mirror shall be observed in a vertical position, with the naked eye and under normal diffused daylight conditions, (maximum 600 lux at the silvered mirror), from a distance of 1000 mm. The direction of observation is normal, i.e. at right angles, to the silvered mirror. The use of an additional lighting source, e.g. spotlight, is not allowed.

7.2.1.2 Glass faults

Glass faults are assessed using the method in 7.2.1.1. The dimension and number of hairline scratches, scratches and spot faults which cause disturbance to vision shall be noted.

7.2.1.3 Reflective silver coating faults

Reflective silver coating faults are assessed using the method in 7.2.1.1. Note the presence of scratches, stains, colour spots and edge deterioration.

7.2.1.4 Edge faults

The edge quality of stock/standard or as-cut finished silvered mirrors can be affected by the presence of entrant/emergent faults and shelling. Using the method of 7.2.1.1, the edges of the silvered glass panes shall be checked for the presence of shells, corners on/off and edge vents.

7.2.1.5 Protective coating(s) faults

Using the method in 7.2.1.1, the presence of pin holes, burst bubbles, flaking of the protective coating along the edges or other faults in the protective coating(s) shall be noted.

7.2.2 Optical quality

7.2.2.1 Qualitative visual inspection method

A silvered mirror shall be examined in areas of 500 mm × 500 mm at a time. The observer shall be located at a distance of 2 000 mm in front of and normal to the area being examined. Behind the observer shall be an irregular background. The reflected image shall not be optically disturbed, e.g. by another reflective surface, window etc. The observed distortions can be quantified using the method in 7.2.2.2.