SLOVENSKI STANDARD

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Steklo v gradbeništvu - Ogledala iz stekla s srebrno prevleko za uporabo v notranjosti stavb - 1. del: Definicije, zahteve in preskusne metode

Glass in building - Mirrors from silver-coated float glass for internal use - Part 1: Definitions, requirements and tests methods

Glas im Bauwesen - Spiegel aus silberbeschichtetem Floatglas für den Innenbereich - Teil 1: Begriffe, Anforderungen und Prüfverfahren

Verre dans la construction - Miroirs en glace argentée pour l'intérieur - Partie 1: Définitions, exigences et méthodes d'essai

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This European Standard was approved by CEN on 12 November 2007.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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Foreword

This document (EN 1036-1:2007) has been prepared by 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of an identical text or by endorsement, at the latest by June 2008, and conflicting national standards shall be withdrawn at the latest by June 2008.

This document supersedes EN 1036:1999.

EN 1036 *Glass in building — Mirrors from silver-coated float glass for internal use* consists of the following parts:

Part 1: Definition, requirements and test methods

Part 2: Evaluation of conformity; product standard

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, 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.

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 European Standard applies only to mirrors from silvered glass manufactured from flat annealed clear or tinted float glass, 2 mm to 10 mm thickness, and supplied in stock/standard sizes and as-cut finished sizes.

This European 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 European Standard is not applicable. This European Standard is not applicable to reflective glass for external glazing applications.

This European 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

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 410, *Glass in building — Determination of luminous and solar characteristics of glazing*

EN 572-2, *Glass in building — Basic soda lime silicate glass products — Part 2: Float glass*

EN ISO 2409, *Paints and varnishes - Cross-cut test (ISO 2409:2007)*

EN ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests (ISO 9227:2006)*

3 Terms and definitions

For the purposes of this document, the following terms and 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
copper-free 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 without use of copper

3.4
stock/standard sizes
panes of mirrors from silver-coated float glass supplied with as-cut edges which are intended for further processing

NOTE For dimensions of jumbo sizes and split sizes see EN 572-2.

3.5
as-cut finished sizes
finished panes of mirrors from silver-coated float glass cut from stock/standard sizes

NOTE They can be subject to further processing, e.g. edge working, drilling, face decoration.

3.6
optical faults
faults directly associated with the distortion of the reflected image

3.7
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

3.8
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

3.9
linear defects
scratches, extended spot faults etc.

3.10
brush marks
very fine circular scratches that can hardly be seen and are associated with glass cleaning techniques

3.11
scratches
any kind of scratches that are not brush marks

3.12
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

3.13
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

3.14
colour spots
alteration of the reflective coating in the form of small, generally coloured spots

3.15
edge deterioration
discolouration of the reflective silver at the edge of the silvered glass

3.16
protective coating(s) faults
faults where the metallic layer is exposed. They can be scratches or loss of adhesion of the protective coating(s)

3.17
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

3.18
pack area
total surface area of the contents of a pack

3.19
cluster
group of not less than 3 spot faults, separated by not more than 50 mm

3.20
halo
distortion zone around a spot fault (see 3.8)

4 Materials

4.1 Glass products

Mirror from silver-coated float glass, according to this European 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.

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 — Thickness and tolerances

Nominal thickness (mm)	Thickness tolerances (mm)
2	± 0,2
3	± 0,2
4	± 0,2
5	± 0,2
6	± 0,2
8	± 0,3
10	± 0,3

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 tolerance, nor smaller than a rectangle defined by their nominal dimensions reduced by the 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 ± 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 EN 410, but with the angle of incidence of the light within 8° of normal. Illuminant will be D65 and observer 2.

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:

- 86 % for float with a thickness between 2 mm and 6 mm;

- 83 % for float with a thickness of 8 mm and 10 mm.

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 lighting conditions, (natural daylight or simulated daylight, between 300 lx and 600 lx at the silvered mirror), from a distance of 1 m. 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 fault

Glass faults are assessed using the method in 7.2.1.1. The dimension and number of brush marks, 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, brush marks, 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 pinholes, 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 m 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. The observed distortions can be quantified using the method in 7.2.2.2.

7.2.2.2 Optional quantitative test method

A projector having a focus distance between 80 mm and 100 mm and an aperture of 8 mm shall be positioned at a distance of 5 m from the specimen being examined, at an angle of 45° to the specimen, which is positioned vertically. A screen shall be located 5 000 mm from the centre of the mirror at right angles to the reflected beam (see Figure 3).

A grid pattern slide, when projected onto the screen shall give dark and clear stripes of 55 mm width. Calibration of the stripe width is achieved by using a non distorted front surfaced mirror in place of the specimen.

The difference in width of each projected stripe, or of three neighbouring stripes shall be measured (see Figure 4).

7.3 Acceptance levels

7.3.1 Glass faults

The acceptance level for glass faults are given in

— Table 2 for stock/standard sizes;

— Table 3 for as-cut finished sizes.

7.3.2 Reflective silver coating faults

Reflective silver coating faults shall not be allowed if visible under examination using the method described in 7.2.1.1.

7.3.3 Edge faults

7.3.3.1 Chips or shells

For stock/standard sizes, entrant or emergent chips or shells, visible under the conditions in 7.2.1.1, shall be accepted provided they do not exceed a maximum length and depth of 10 mm and half the nominal glass thickness (see Figure 6).

For as-cut finished sizes, entrant or emergent chips or shells, visible under the conditions in 7.2.1.1, shall be accepted provided they are not greater than 1,5 mm deep (see Figure 7).