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**Glass in building — Silvered, flat-glass  
mirror**

*Verre dans la construction — Miroir argenté en verre plat*

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 25537 was prepared by Technical Committee ISO/TC 160, *Glass in building*, Subcommittee SC 1, *Product considerations*.

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## Introduction

This International Standard specifies tests procedures for assessing the durability of a mirror by measuring its ability to resist corrosion, and adhesion of its protective paints.

Two of the tests prescribed are defined in other International Standards: ISO 9227 and ISO 2409.

Two additional tests, a water-condensation test and a dip test, are also prescribed and the procedure for carrying them out is described in annexes.

This International Standard also specifies the minimum requirements regarding reflectance as well as reflective silver-coating faults, edge faults and protective-coating faults, and optical quality.

The quality of a silvered mirror can be affected by faults that 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.

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# Glass in building — Silvered, flat-glass mirror

**SAFETY PRECAUTIONS** — This International Standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this International Standard to establish appropriate safety and health practices and to determine the applicability of regulatory requirements prior to use.

## 1 Scope

This International Standard specifies the minimum quality requirements (regarding optical, visual and edge faults) and durability tests for silvered float glass for internal use in buildings.

This International Standard applies only to mirrors from silvered glass manufactured from flat, annealed clear or tinted float glass, from 2 mm to 6 mm thick, and supplied in stock/standard sizes and as-cut finished sizes to which no further processing (such as edgework or other fabrication) has been done.

**NOTE** Upon consultation with the mirror manufacturer, it is possible to apply this International Standard to float glass having a thickness less than 2 mm or greater than 6 mm.

This specification covers the quality requirements of silvered, annealed, monolithic, clear and tinted flat glass mirrors.

Mirrors covered in this specification are not intended for use in environments, e.g. horse-riding halls, swimming pools, medical baths, saunas, swimming pool areas, chemical laboratories and other corrosive environments, where high humidity or airborne corrosion promoters, or both, are consistently present. This International Standard is not applicable to reflective glass for external glazing applications.

## 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 2409:2007, *Paints and varnishes — Cross-cut test*

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

ISO 9050, *Glass in building — Determination of light transmittance, solar direct transmittance, total solar energy transmittance, ultraviolet transmittance, and related glazing factors*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1

#### **fault**

#### **blemish** US

imperfection in the body or on the surface of the mirror

3.2

**linear fault**

scratch, hairline scratch, rub, dig, extended spot fault and other similar imperfections

3.3

**spot fault**

halo, colour spot, dirt, pinhole, stone, gaseous inclusion (seed or bubble), tin particle, deposit and other similar imperfection

3.4

**centre zone**

central part of a mirror defined by 80 % of the length and 80 % of the width dimensions

3.5

**chip**

imperfection on the edge of a mirror due to breakage of a small fragment out of an otherwise-regular surface

3.6

**cloud**

frosted appearance in the reflected image from a silvered mirror

3.7

**cluster**

group of not fewer than three spot faults separated by not more than 50 mm

3.8

**colour spot**

alteration of the reflective coating in the form of a small, generally coloured spot

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3.9

**dig**

deep, short scratch in the glass surface

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3.10

**dirt**

small particle of foreign material imbedded in the glass surface

3.11

**edge corrosion**

change in the colour or level of reflectance along the mirror edge as a result of degradation of the silver coating from external sources

3.12

**edge fault**

fault that affects the as-cut edge of the silvered glass

NOTE Edge faults can include entrant/emergent faults, shelling, corners on/off, vents (small cracks), chips, shell chips, and flare.

3.13

**edgework**

fabrication of the mirror edge beyond the original clean-cut condition

3.14

**flare**

protrusion on the edge of a piece of mirror



**3.15****gaseous inclusion****seed****bubble**

round or elongated bubble at the surface (open) or within the body thickness leaving a cavity in the mirror

**3.16****hairline scratch**

very fine, circular scratch that can barely be seen that is associated with glass-cleaning techniques

**3.17****halo**

distortion zone around a spot fault

**3.18****silvered mirror**

flat, annealed, clear or tinted float glass, the rear surface of which has been coated with a protected reflective silver layer

**3.19****mirror cut size**

mirror cut to a stock/standard size that is intended for final use in the size ordered (i.e. mirror not intended for re-cutting)

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

**3.20****mirror stock size**

mirror intended for architectural use supplied with as-cut edges, where trimming is required

**3.21****optical fault**

fault directly associated with the distortion of the reflected image

**3.22****protective coating(s) fault**

pinhole, burst bubble, scratches or loss of adhesion of the protective coating(s) and other types of faults in the protective coating(s) where the metallic layer is exposed

**3.23****reflective silver-coating fault**

fault in the reflective silver layer, altering the appearance of the silvered glass, e.g. scratches, colour spots and edge deterioration and corrosion

**3.24****rub**

abrasion of the mirror surface producing a frosted appearance

**3.25****scratch**

damage on the glass surface in the form of a line caused by the movement of an object in contact with the glass surface relative to the surface

**3.26****shell chip**

circular indentation in the mirror edge due to breakage of a small fragment

**3.27**

**silver coating**

metallic silver layer in a silvered mirror product

**3.28**

**stain**

alteration of the reflective coating characterized by a more or less brownish, yellowish or greyish colouration of zones

NOTE Stains can sometimes cover the whole reflective surface.

**3.29**

**stone**

crystalline inclusion in the mirror

**4 Materials**

**4.1 Glass products**

Silvered, flat-glass mirror shall be manufactured from monolithic float glass. In the absence of an appropriate International Standard for float glass products, and until such an International Standard is published, the float glass used shall conform to the appropriate national standards.

**4.2 Reflective coating**

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The mirror shall be manufactured with a reflective coating made of silver.

**4.3 Protective coating(s)**

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The reflective coating described in 4.2 shall be protected by one or more layers and/or protective coatings e.g. paint, lacquer, etc.

**5 Dimensions**

The dimensional tolerances for thickness, length, width and squareness of the mirrors shall be those applicable to float glass.

**6 Reflectance of clear glass mirrors**

Measurement of reflectance shall be undertaken in accordance with ISO 9050 with an angle of incidence of the light within 8° of normal. For the calculation of the reflectance, illuminant D65 and a 2° observer shall be used.

When measured in accordance with ISO 9050, the minimum visible-light reflectance of silvered mirrors made of clear glass shall be at least 83 %.

The reflectance of mirrors made from tinted glass, when measured in accordance with ISO 9050, may be below 83 %.

## 7 Quality requirements

### 7.1 Quality assessment and inspection methods for silvered mirrors

#### 7.1.1 Glass, reflective coating, edge and protective coating quality

##### 7.1.1.1 Inspection method

The silvered mirror shall be observed in a vertical position, with the naked eye and under normal diffused daylight conditions, (between 100 lx and 1 000 lx at the silvered mirror), from a distance of 1 000 mm. The direction of observation shall be normal, i.e. at right angles, to the silvered mirror. The use of an additional lighting source, e.g. spotlight, shall not be allowed.

##### 7.1.1.2 Glass faults

Glass faults shall be assessed in accordance with the method described in 7.1.1.1. The dimensions and number of spot faults and linear faults that cause disturbance to the image shall be noted.

##### 7.1.1.3 Reflective silver coating faults

Reflective silver-coating faults shall be assessed in accordance with the method described in 7.1.1.1. The dimensions and number of spot faults and linear faults that cause disturbance to the image shall be noted.

##### 7.1.1.4 Protective coating(s) faults

The presence of protective coating(s) faults shall be assessed in accordance with the method described in 7.1.1.1 looking at the protective-coated side (backside) of the mirror.

##### 7.1.1.5 Edge faults

The presence of edge faults shall be assessed in accordance with the method described in 7.1.1.1. The dimensions of the chips, shell chips and flares shall be measured. The depth shall be the measured distance of a fault from the face of the mirror into the thickness. The length shall be the distance, parallel to the edge of the mirror, from one edge of a fault to the other. The width shall be the perpendicular distance from the edge of the mirror to the inner edge of the fault.

##### 7.1.1.6 Cloud and stain

The presence of cloud and stain shall be assessed in accordance with the method described in 7.1.1.1.

#### 7.1.2 Qualitative visual inspection method of the optical quality

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.

## 7.2 Acceptance levels

### 7.2.1 Glass faults

Acceptance level for glass faults shall be as given in Table 1.

### 7.2.2 Reflective silver-coating faults

Acceptance level for reflective silver-coating faults shall be as given in Table 1.