INTERNATIONAL STANDARD

ISO 11479-1

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Glass in building — Coated glass —

Part 1: Physical defects

Verre dans la construction — Verre à couche — Partie 1: Défauts physiques

Reference number
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Foreword

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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 11479-1 was prepared by Technical Committee ISO/TC 160, *Glass in building*, Subcommittee SC 1, *Product considerations*.

ISO 11479 consists of the following parts, under the general title *Glass in building — Coated glass*:

— *Part 1: Physical defects*

— *Part 2: Colour of façade*

Glass in building — Coated glass —

Part 1: Physical defects

1 Scope

This part of ISO 11479 specifies optical quality requirements for coatings applied to glass using either pyrolytic, sol-gel or vacuum (sputtering) deposition methods for use in building glazing. More specifically, this part of ISO 11479 relates to low-e and solar-control coated glass. This part of ISO 11479 is not applicable to patterned or other optically distorting glass.

2 Terms and definitions

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

2.1 Basic definitions

2.1.1
method of deposition
method of adding a single or multilayer coating consisting of metal, oxide, nitride, fluoride or other compound to the surface of the glass by vacuum (sputtering), sol-gel or pyrolytic deposition

2.1.2
coated glass
glass substrate to which a coating has been applied on one or both sides in order to modify one or more of its properties

2.1.3
coating
one or more layers applied to the glass using either the pyrolytic, sol-gel or vacuum (sputtering) deposition method

2.1.4
finished size glass
flat glass sheet cut to the dimensions required for final fabrication or use

2.1.5
stock size glass
jumbo size glass
standard size of annealed flat glass sheet that may be cut down to a smaller finished size for fabrication

2.1.6
daylight illumination
uniform overcast sky, with or without direct sunlight

2.1.7
glass substrate
glass to which the coating is applied to either one or both sides

NOTE Examples of glass substrates are: basic float glass (clear or body-tinted), thermally or chemically toughened safety glass, thermally toughened borosilicate safety glass, heat-strengthened glass, heat-strengthened borosilicate glass, laminated glass, laminated safety glass, alkaline earth silicate glass, or toughened alkaline earth silicate glass.

2.1.8
pyrolytic deposition
online coating
method of manufacture of a coating, whereby the coating is applied to hot glass, usually at the time of flat glass manufacturing

2.1.9
sol-gel coating
offline coating
method of manufacture of a coating, whereby the coating is applied to flat glass on a wet coating line

2.1.10
vacuum deposition
offline coating
method of manufacture of a coating, whereby the coating is applied to flat glass in a vacuum chamber

2.2 Definition of physical defects

2.2.1
coating rub
surface abrasion of appreciable width that has a partial or complete removal of the coating, producing a hazy appearance

2.2.2
corrosion
change in the colour or level of reflected or transmitted light over all or part of the glass surface as a result of degradation of the coating from external sources

2.2.3
crazing
conglomeration of fine lines or cracks in the coating

2.2.4
punctual defect
punctual disturbance of the visual transparency when looking through the glass and of the visual reflectance when looking at the glass

NOTE Spots, pinholes and scratches are types of punctual defect.

2.2.5
spot
punctual defect that commonly looks dark against the surrounding coating, when viewed in transmission

2.2.6
pinhole
punctual void in the coating with partial or total absence of coating

2.2.7
scratch
partial, or complete, removal of the coating along a thin, straight or curved line

2.2.8
stain
defect in the coating which is larger than a punctual defect, often irregularly shaped and partially of a mottled or patchy structure

3 Physical defects

3.1 General

The defects specific to the coating and the defects specific to the glass substrate that are more visible because of the coating shall be treated as coating defects.

3.2 Detection of defects

3.2.1 General

The defects shall be detected visually by observing the coated glass in transmission and/or reflection. An artificial sky or daylight shall be used as the source of illumination.

3.2.2 Artificial sky

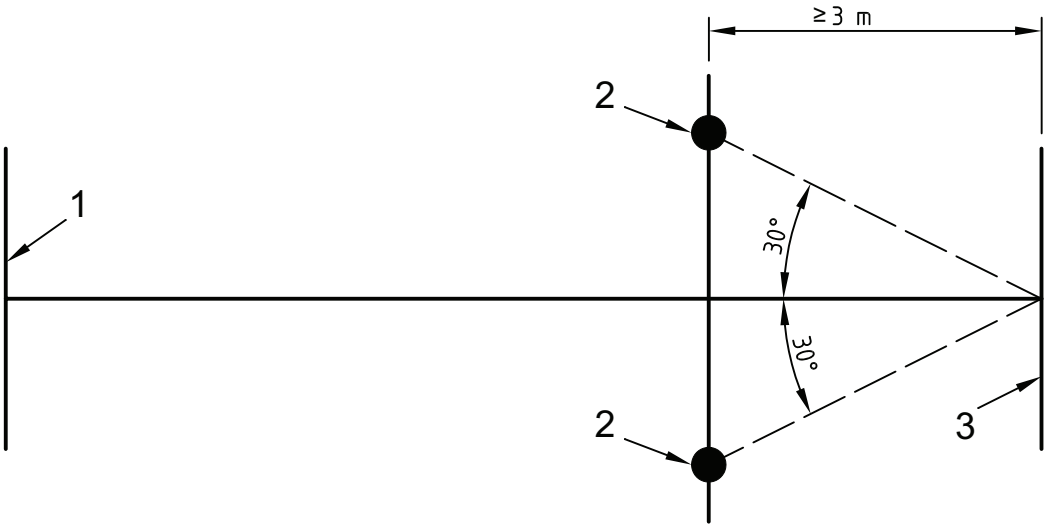
An artificial sky is defined in CIE 13.3, and shall be obtained by using a light source whose correlated colour temperature is in the range between 4 000 K and 6 000 K. In front of the arrangement of light sources, there shall be a light-scattering panel, without spectral selectivity. The illuminance level on the glass surface shall be between 400 lx and 20 000 lx.

3.3 Conditions of examination

3.3.1 General

Coated glass may be examined in either stock size plates or in finished sizes ready for installation. The examination may be undertaken in the coating factory, the fabrication factory, at the building site or on the building façade.

The pane of coated glass being examined shall be viewed from a minimum distance of 3 m with illumination behind the observer for reflected observation, and behind the glass for transmitted observation. The examination of the coated glass in reflection shall be performed by the observer looking at the side which will be the outside of the glazing. The examination of the coated glass in transmission shall be performed by the observer looking at the side that will be the inside of the glazing. During the examination, the angle between the perpendicular to the surface of the coated glass and the light beam reaching the eyes of the observer after reflection or transmission by the coated glass shall not exceed 30°, as shown in Figures 1 and 2.

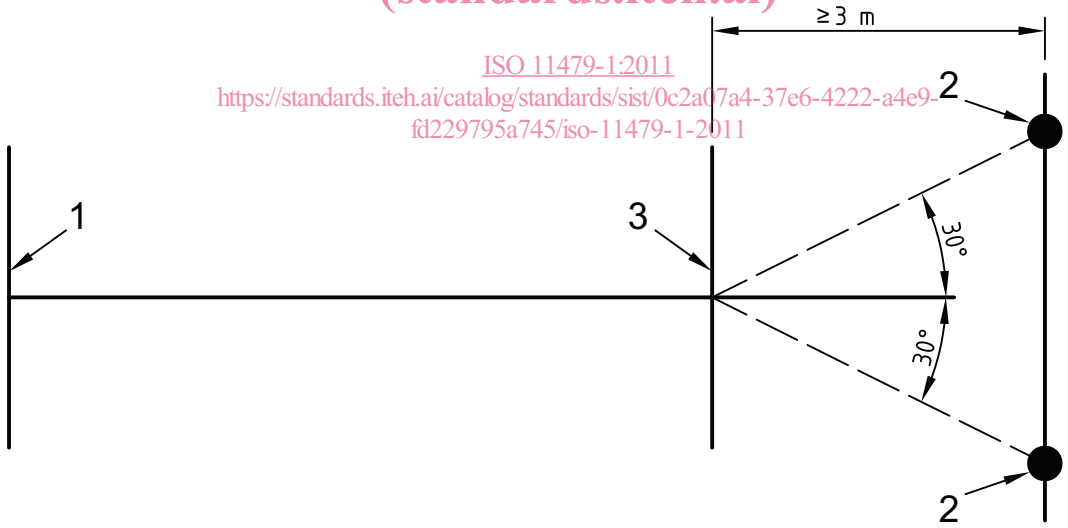


Key

1 illumination source
2 observer position
3 coated glass sample

NOTE This is a plan view.

Figure 1 — Schematic for reflected light observation of coated glass



Key

1 illumination source
2 observer position
3 coated glass sample

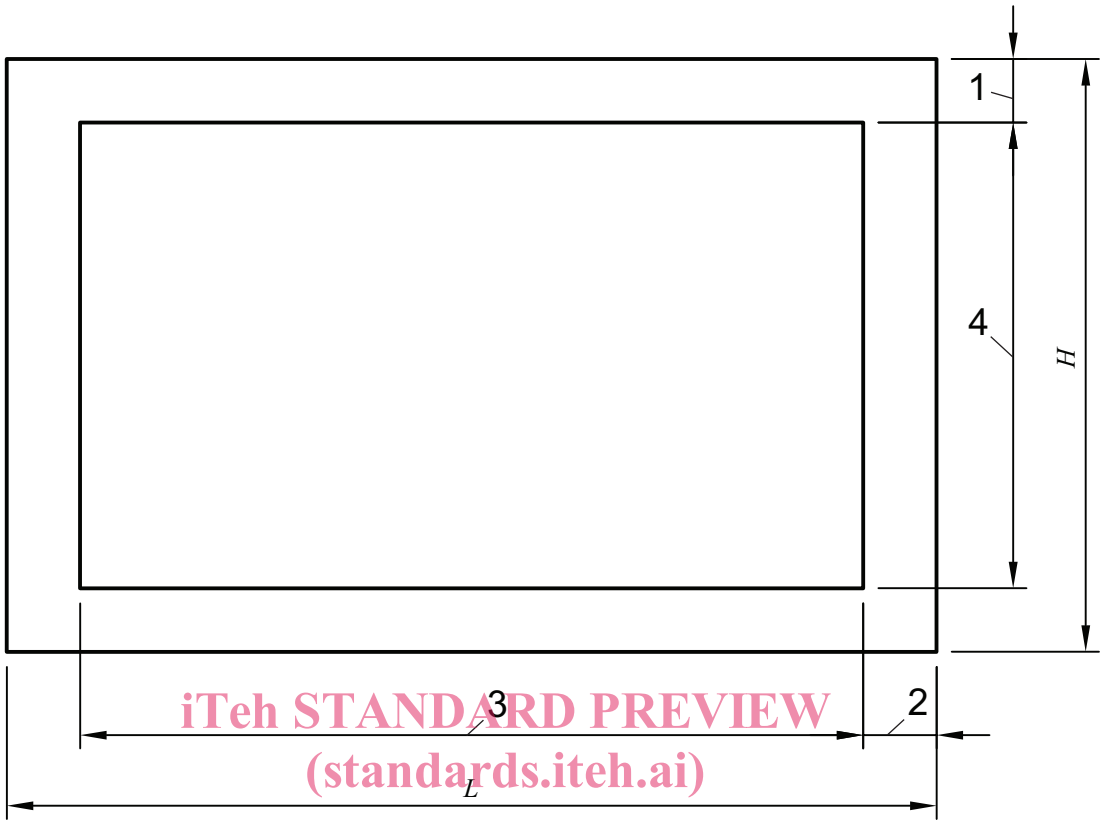
NOTE This is a plan view.

Figure 2 — Schematic for transmitted light observation of coated glass

3.3.2 Central and edge areas for finished sizes

For panes of coated glass in finished sizes ready to be installed, both the central area and an edge area of the pane shall be examined, as shown in Figure 3.

The central area shall be deemed to be the square or rectangle defined by the centre 80 % of the length and 80 % of the height dimensions centred on a pane of glass. The remaining area shall be deemed to be the edge area.



Key

1 total edge area height is 20 % of H dimension (10 % + 10 %)
2 total edge area length is 20 % of L dimension (10 % + 10 %)
3 central area length is 80 % of L dimension
4 central area height is 80 % of H dimension

NOTE Each examination shall take no more than 20 s.

Figure 3 — Areas to be examined on finished sizes ready for glazing

3.3.3 Central and edge areas for stock and jumbo sheet sizes

For panes of coated glass in stock and jumbo sizes, the edge area shall be deemed to be a 10 cm border surrounding the entire pane. The central area shall be deemed to be the remaining area of the pane.

3.4 Punctual defects

Under the conditions of examination given in 3.3, note any spots, pinholes and/or scratches that are noticeable.

For spots or pinholes, measure the size and note the number relative to the size of the pane. If there are any clusters found, determine their position relative to the through-vision area.

For scratches, determine whether or not they are in the central or edge area. Measure the length of any scratches noted. For scratches over 75 mm long, determine the distance between adjacent scratches. For scratches smaller than or equal to 75 mm long, note any area where their density is noticeable.