

# Policy for assessment of visual quality

## of Isofirewood<sup>®</sup> wooden doors

## of Isofireglas<sup>®</sup> fire-resistant glass

The foundations for application of the following assessment criteria are:

- product standards, where applicable;
- technical instructions, assembly instructions and use and maintenance instructions supplied by the manufacturer.

## 1. Scope and field of application

This document defines the assessment methods and criteria to be used when opening the packaging and installing the product in relation to the quality and optical/visual properties of San.Co® doors for use in public and private residential, commercial, hotel, hospital and other constructions.

Specifically, in view of the state of the art of technology and production and the existing legislative framework, this document defines the examination methods and tolerances and classifies and distinguishes between defects which are permitted and not permitted, as they should not specifically be considered defects.

This document applies to doors made of solid wood, blockboard, plywood or hollow core wood, unfinished and/or coated and/or painted, which may be fire-resistant, soundproofed or for internal use.

This document does not apply to external pedestrian doors, defined as doors separating the indoor space from the outdoors.

## 2. References to legislation

UNI EN 313-2	Plywood – Classification and terminology
UNI EN 322	Wood-based panels – Determination of moisture content
UNI EN 572-2	Glass in building – Basic soda lime silicate glass products – Part 2: Float glass
UNI EN 951	Door leaves – Method for measurement of height, width, thickness and squareness
UNI EN 952	Door leaves – General and local flatness – Measurement method
EN 1096-1	Glass in building – Coated glass – Part 1: Definitions and classification
UNI EN 1279-1	Glass in building – Insulating glass units – Part 1: Generalities, dimensional tolerances and rules for the system description
UNI EN 1863-1	Glass in building – Heat strengthened soda lime silicate glass – Part 1: Definition and description
UNI EN ISO 4618	Paints and varnishes – Terms and definitions
UNI 6467	Veneer plywood and core plywood – Terms and definitions
UNI 6534	Glazing and fixing of glass for buildings. Design, materials and laying
UNI 10578	Natural veneers and treated natural veneers. Terms and definitions
UNI/TR 11404	Insulating glass units for building applications – Appearance for doors and windows
UNI EN 12150-1	Glass in building – Heat strengthened soda lime silicate glass – Definition and description
UNI EN ISO 12543-1	Glass in building – Laminated glass and laminated safety glass – Definitions and description of component parts
UNI EN ISO 12543-5	Glass in building – Laminated glass and laminated safety glass – Dimensions and edge finishing
UNI EN ISO 12543-6	Glass in building – Laminated glass and laminated safety glass – Appearance
UNI EN 12775	Solid wood panels – Classification and terminology
UNI EN 13986	Wood-based panels for use in construction – Characteristics, evaluation of conformity and marking
prEN 14351-2	Windows and doors – Product standard – Part 2: Internal pedestrian doorsets without resistance to fire and/or smoke leakage characteristics
UNI EN 1449	Glass in building – Laminated glass and laminated safety glass – Assessment of conformity/product standards

### 3. Terms and definitions

For the purposes of this document the terms and definitions appearing in the standards listed under point 2. *References to standards*, shall apply, along with the following:

Terms	Definitions
Adherence	Resistance of a film of paint to peeling, detachment due to tearing and chipping
Fitch	A set of bundles of veneer arranged in the same order as they were cut from a single trunk or part thereof
Bubbles	Bubbles in glass are caused by the presence of air or visible extraneous substances. Bubbles in wood are swellings of rounded shape attributable to the presence of air or gas formed in the painting process due to inappropriate physical parameters or chemical reaction of the painted product
Gloss level	Reflective power of a film of paint in relation to incident light
Orange peel	Defective application of a film of paint producing an orange-peel effect. To the touch the surface does not feel smooth, and in the light the typical orange peel look is visible
Coverage	Characteristic ability of paint to cover irregularities in the substrate
Craters	Formation of little hollows which remain even when the product is completely dry. Craters in wood consist of bubbles which have burst and left behind a circular edge forming a crater, over which paint cannot flow
Flow	The property which allows a film of paint, once hardened, to create a surface which is as smooth as possible, without cracking, "orange peel" corrugation, craters, pinpoints, fish-eye, dripping, etc.
Flares, stripes or bands	Presence of bands of different hues, visible when looking from a certain direction
Finishing	Treatment of a surface by application of one or more layers of film-generating products to protect it, change its colour or reveal its decorative properties
Joint	Juxtaposition of two veneer elements
Gloss	Unit of measurement of the gloss level of paint, measurable with the appropriate instrument, indicating reflection of light on the surface at a given angle of incidence
Scratches	Various linear and non-linear signs, the visibility of which depends on their length, depth, position and arrangement
Capillary scratches	Various very fine linear and non-linear marks
Lacquering	Surface finish obtained through successive application of opaque, eggshell or glossy film-generating products
Squareness	Presence of a right angle between two consecutive surfaces of the door leaf
Bundle	A set of veneers arranged in the same order as they were cut from a single trunk or part thereof

Plywood panel	Panel made from wood consisting of a number of layers glued together, normally with the wood fibres in adjacent layers set at right angles to one another
Solid wood or blockboard panel	Panel consisting of pieces of wood glued edge to edge and, in the case of plywood panels, face to face
Solid wood single-layer panel	Solid wood panel consisting of numerous pieces of wood glued together to form a layer
Solid wood panel with pieces cut lengthwise	Solid wood panel made of pieces of wood cut lengthwise, normally glued together end to end or with finger joints ("SC" type)
Solid wood panel with pieces uncut lengthwise	Solid wood panel consisting of pieces of wood which run the entire length of the panel ("NC" type)
Solid wood multi-layer panel	Solid wood panel consisting of two outer layers with fibre running parallel and at least one inner layer with fibre at an angle of 90° to the outer layers
Natural veneer	A thin sheet of wood of constant thickness, up to a maximum of 5 mm, obtained from a trunk or a part thereof by peeling, slicing or sawing. The trunk or part thereof may be subjected to mechanical processing and/or heat and moisture treatment with steam to prepare it for cutting. Note 1: the term veneer is commonly used in the business to refer to both the veneer sheet and application of the veneer sheet to the substrate Note 2: Part of trunk refers to a prismatic element obtained from a trunk by cutting it lengthwise Note 3: In the case of sliced veneer, the part of the trunk may be referred to as a fourth or a third
Natural treated veneer	Natural veneer subjected to treatments and/or chemical processes to give it particular physical, chemical or aesthetic properties
Colour-treated natural veneer	Natural veneer colour treated throughout its entire thickness. Commonly referred to as "dyed natural veneer"
Flatness	Conformity of a surface to a theoretical plane, within the permitted tolerance
General flatness of the opaque leaf	This property must be checked using a straight bar long enough to cover the height of the leaf as a reference
Local flatness of the opaque leaf	This property must be checked using a straight bar 200 mm long
Internal pedestrian door	Building component designed and used to close a permanent opening in internal dividing elements, the principal use of which is to permit pedestrian access
Surface residues	Surface impurities from processing
Fish-eye	A limited area in which the layer of paint fails to adhere to the substrate
Dry or uncovered	An anomaly in polishing, which leaves the substrate below visible at certain points
Filling	Repair performed by filling in defects in shape with filler, restoring theoretical surface continuity

Hollow core wood	A solid consisting of adjacent external surfaces with a "honeycomb" structure inside to give the structure rigidity
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#### 4. Door inspection method

The door may be examined visually or with instruments. Examination with instruments is performed as described in point 5. Visual inspection is performed as described below.

##### 4.1. Opaque wooden door

Visual inspection must be performed on an installed door or one in a similar position, if not yet installed, from a distance of 1.5 m, at right angles to the surface to be inspected, with natural light coming from behind the observer or diffuse artificial light. In accordance with the requirements of technical standards, light may not be directed straight onto the product or a part of it to be inspected.

Wooden doors incorporating panes of glass must be examined as described in point 4.1 with regard to the opaque part, while the glass part must be examined as described in point 6.

#### 5. Limits on acceptance of wooden doors

Wooden doors and their accessories (frame, moulding, cornices and base boards where applicable) must be installed in spaces with the following climatic conditions: temperature between 18°C and 23°C and relative humidity of 45% to 60%.

##### 5.1. Height, width and thickness

Leaf height, width and thickness must be measured as stated in UNI EN 951, and may present the following tolerances:

- Height:  $\pm 2$  mm;
- Width:  $\pm 2$  mm;
- Thickness:  $\pm 1$  mm.

The same tolerances apply to the other elements of the door (fixed frame, moulding, etc.).

##### 5.2. Moisture content

In accordance with the specific technical standards applying to panels, and considering that these standards apply to the unfinished product, the moisture content of the finished door must be measured with a contact hygrometer at the height of the lock and on the lower strip.

- If measured on panels of solid wood, hollow core wood, plywood, multilayer wood or blockboard: moisture content must be between 10% and 13% (at the time of initial delivery).
- If measured on composite panels (particleboard or MDF): moisture content must be between 6% and 9% (at the time of initial delivery).

##### 5.3. Squareness

Squareness must be measured on the leaf as stated in UNI EN 951, and may have the following tolerance:

- Squareness: 1 mm.

#### 5.4. General and local flatness

General and local flatness must be measured on the leaf as stated in UNI EN 952, and may have the following tolerance:

- General flatness: 2.5 mm/m;
- Local flatness: 0.6 mm /200 mm.

#### 5.5. Finishing

Finishing is assessed visually.

##### 5.5.1. Transparent finishes on veneer

In the presence of a transparent finish, colours and veins may not correspond to the company's reference samples, as they are applied to wooden veneer or solid wood which is by nature variable in colour and veins. As the various elements making up the door (panel, outer edges, door jamb, moulding, glazing bead, etc.) may be taken from different fitches or trunks, differences in the veins and colour are permitted among them. In construction of veneer, to obtain a symmetrical design, veneers in opposite directions are set side by side, which very often have different colours between the right and the left due to the fact that the direction of the pores is opposite as the veneer has been reversed.

The same rules apply to vertical and horizontal juxtapositions of veneers. Moreover, if products are supplied at different times, the passage of time, the different cuts (fitches) and environmental factors may cause variations in hue and/or colour (oxidation) which do not constitute defects.

The species of wood used may also present typical features which are characteristic of its nature and not defects (such as, by way of example, gum pockets in cherry, knots, etc.). The visible area and part of the edge must be inspected from both vertical sides (hinge side and lock side).

Veneer quality level – refer to AWI Custom grade.

##### 5.5.2. Lacquered finishes

The following references apply to assessment of lacquered finishes:

- RAL 840 HR scale for opaque colours and RAL 841 GL scale for glossy colours;
- Colour tolerance: difference  $\Delta < 0.5$  (photometer reading).

The permitted tolerances are shown in the table below.

##### 5.5.3. Finishes with various types of laminate/plastic melamine

As these finishes are produced using paper impregnated with various substances, differences in hue and colour are permitted among the various elements making up the door (panel, edges, door jamb, moulding, glazing bead, etc.).



The permitted tolerances are shown in the table below.

Zone	Parameters	Transparent Finishes	Lacquered Finishes	Finishes with various types of laminate/plastic melamine
Leaf	Adherence	Paint must be anchored to the substrate	Paint must be anchored to the substrate	Laminate must be anchored to the substrate
Leaf	Gloss level	Must be uniform over the entire surface, with a tolerance of $\pm 10$ gloss compared to the manufacturer's declared value	Must be uniform over the entire surface, with a tolerance of $\pm 10$ gloss compared to the manufacturer's declared value	Must be uniform over the entire surface, with a tolerance of $\pm 5$ gloss between the various components
Leaf	Filler	Filler may be used on surfaces measuring $\leq 10 \text{ mm}^2$ in a colour which does not contrast with that of the wood species	Not permitted	Filler may be used on surfaces measuring $\leq 10 \text{ mm}^2$ in a colour which does not contrast with that of the finish
Leaf	Surface flow	There must not be scratches, craters, pinholes or fish-eyes	There must not be scratches, craters, pinholes or fish-eyes	There may be 1 surface scratch $\leq 20 \text{ mm}$ long. There may be 1 point in a different colour with a diameter of $\leq 2 \text{ mm}$
Leaf	Bubbles or presence of foreign substances	There must not be bubbles caused by air or by incorporation of foreign matter	<b>There must not be bubbles caused by air or by incorporation of foreign matter</b>	There may be 1 bubble caused by air or incorporation of foreign matter with a diameter of $\varnothing \leq 5 \text{ mm}$
Leaf	Coverage	In the case of veneer, there must not be any dry spots	In the case of lacquering, the colour must be uniform all over and the colour of the base must not be visible	There must not be any dry spots
Frame and edges	Adherence	Paint must be anchored to the substrate	Paint must be anchored to the substrate	Laminate must be anchored to the substrate
Frame and edges	Gloss level	Must be uniform over the entire surface, with a tolerance of $\pm 10$ gloss compared to the manufacturer's declared value	Must be uniform over the entire surface, with a tolerance of $\pm 10$ gloss compared to the manufacturer's declared value	Must be uniform over the entire surface, with a tolerance of $\pm 5$ gloss between the various components



Frame and edges	Filler	Filler may be used on surfaces measuring $\leq 40 \text{ mm}^2/\text{m}$ in a colour which does not contrast with that of the wood species	Filler may be used on surfaces measuring $\leq 40 \text{ mm}^2/\text{m}$ in a colour which does not contrast with that of the rest of the door	Filler may be used on surfaces measuring $\leq 40 \text{ mm}^2/\text{m}$ in a colour which does not contrast with that of the finish
Frame and edges	Surface flow	There may be micro cracks in the proximity of folds in the edge, provided they are not sharp to the touch. There may be 1 surface scratch of $\leq 20 \text{ mm}/\text{m}$ . There may be 2 craters, 2 pinholes and/or 2 fish-eyes with a diameter of $\varnothing \leq 2 \text{ mm}/\text{m}$	There must not be any micro cracking in the proximity of folds in the edge. There may be 2 surface scratches of $\leq 20 \text{ mm}/\text{m}$ . There may be 2 craters, 2 pinholes and/or 2 fish-eyes with a diameter of $\varnothing \leq 2 \text{ mm}/\text{m}$	There may be micro cracks in the proximity of folds in the edge, provided they are not sharp to the touch. There may be 2 surface scratches of $\leq 20 \text{ mm}/\text{m}$ . There may be 2 craters, 2 pinholes and/or 2 fish-eyes with a diameter of $\varnothing \leq 2 \text{ mm}/\text{m}$
Frame and edges	Bubbles or presence of foreign substances	There may be 1 bubble caused by the presence of air or incorporation of foreign matter with a diameter of $\varnothing \leq 5 \text{ mm}$	There may be 1 bubble caused by the presence of air or incorporation of foreign matter with a diameter of $\varnothing \leq 5 \text{ mm}$	There may be 1 bubble caused by the presence of air or incorporation of foreign matter with a diameter of $\varnothing \leq 5 \text{ mm}$
Frame and edges	Coverage	In the case of veneer, dry spots are acceptable in the vicinity of edges with a surface of $\leq 25 \text{ mm}^2$	In the case of lacquering, the colour must be uniform all over and the colour of the base must not be visible	There must not be any dry spots
Frame and edges	Joint	In the case of veneer edges, there may be one joint per 1500 mm	---	---

## 6. Features of glass

Isofireglas® is a special stratified glass composed of multiple layers of float glass assembled with transparent intumescent interlayers, and may therefore present:

- Variations in colour depending on structure;
- Some optical deformation;
- Various defects such as bubbles and various inclusions within the limits set forth below.

Inspection conditions:

- Distance from glass to observer: 2 metres
- Distance from glass to the room background: 1 metre
- Background colour: Black
- Intensity of lighting in the area between the glass and the background: 1000 lux measured perpendicularly to the surface of the glass at about 5 cm from it
- Intensity of lighting in the area between the glass and the observer: ambient light

The observer is in front of the glass, looking at the background through it for a maximum of 15 sec / m<sup>2</sup>.

Defects which cannot give rise to complaints

- All defects visible under the inspection conditions described above
- All defects included in the area that will be against the frame (20 mm peripheral strip)
- Isolated bubbles and/or circular defects with a diameter of 3 mm or less
- Isolated lengthwise inclusions up to 10 mm long
- Isolated lengthwise inclusions up to 1 mm wide

Defects which may give rise to claims

All defects not described above may give rise to complaints

Reference parameters

### 1 – Temperature

Isofireglas® is a special stratified glass composed of multiple layers of float glass assembled with transparent intumescent interlayers, and so the glass must be used at temperatures within a range of -20°C to + 40°C. If these limits are exceeded the process of deterioration of the silicates constituting the intumescent interlayer will begin.

### 2– Irradiation

Short wave irradiation (typically UV-A and UV-B) by natural or artificial light may activate the intumescent interlayers in Isofireglas® and cause the interlayers to become opaque. It has been found that glass elements installed inside buildings, which should not be exposed to UV radiation, can actually be damaged by UV rays due to reflection of sunlight from an adjacent building or the passage of light through external windows.

For this reason, where it is possible that there may be UV radiation, it is prudent to use glass with UV protection: it is perfectly acceptable to use glass without UV protection if you are certain that it will not be struck by sunlight, for instance if it is installed in a corridor inside the building.

Note that the standards applicable to durability of stratified glass and stratified safety glass, UNI EN ISO 12543-4:2000, in chapter 6 “Irradiation tests” establishes the “Proceeding for simulation of exposure to sunlight” used to replicate in the laboratory, through a system of lamps, the “source of radiation” for a duration of 2000 hours with a total level of radiation of 900 W/m<sup>2</sup> ± 100 W/m<sup>2</sup>.

This procedure replicates sunlight, with strong irradiation and a long test duration: we have no information on test standards for radiation from artificial light. As the radiation emitted by interior lighting is certainly below the levels



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Sede Legale Loc. Lorenzi 37021 BOSCO CHIESANUOVA (VR) – Italy  
Tel. +39 045 7050988 Fax. +39 045 6780108  
Reg. Imp. VR 02764840233 R.E.A. VR 281454 Import/Export n. TN281454  
Cap. Soc. € 500.300,00 i.v. - C. F. e P. I.V.A. 02764840233 Attestazione  
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of sunlight replicated in the laboratory, we recommend use of lighting with adequate UV filters which, on the basis of the manufacturer's experience, are safe for UV radiation of Isofireglas®.

#### Safe Use – Visibility of Glass

Large panels of clear glass used as dividers in a building may not be immediately visible, particularly under certain lighting conditions.

People passing around them in the building may not be able to see the glass and may walk into it.

The areas described above are clear panels of glass forming or incorporated in internal and external walls or doors of shops, showrooms, offices, production facilities and other non-residential buildings.

Permanent systems must be used to make the glass visible only in the absence of any other indicators.

If it is necessary to ensure the visibility of the glass, markers must be large enough to ensure that they are noted immediately and must be positioned between 600 and 1500 mm above floor level.



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## 7. Product inspection operating methods

The product is delivered after being tested on the basis of the manufacturer's own quality control procedures and on the basis of these guidelines.

In any case, prior to installation the reseller/installer/user is always asked to inspect the product visually for any clearly evident defects, notifying the manufacturer/reseller (supplier) if any are found.

This does not include any defects which may result from "distraction during installation or movement" and are recognisable as such (by way of example, scratches made with the screwdriver when applying the handle, nails for anchoring the plasterboard into retractable doors, vertical scratches caused by opening the packaging with a cutter, etc.).

In all cases of contestation, the manufacturer's own technicians must be given the opportunity to inspect the contested material.



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Sede Legale Loc. Lorenzi 37021 BOSCO CHIESANUOVA (VR) – Italy  
Tel. +39 045 7050988 Fax. +39 045 6780108  
Reg. Imp. VR 02764840233 R.E.A. VR 281454 Import/Export n. TN281454  
Cap. Soc. € 500.300,00 i.v. - C. F. e P. I.V.A. 02764840233 Attestazione  
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