

Anti-reflective glass

SGG VISION-LITE[®]

Instructions for use

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1- Description

1.1. Description of product

SGG VISION-LITE is a glass with very low light reflectance (1%). It is available in laminated form, using SGG DIAMANT extra-clear glass; the 2 external faces of the laminated glass have transparent oxide coatings or metal nitride coatings which, by reducing the reflectance of the surface of the glass, improve the transparency of the glass and the visibility of objects viewed through it.

In comparison with standard clear glass, SGG VISION-LITE glass has:

- much greater transparency;
- an extremely low light reflectance level;
- a higher light transmittance level;
- much better colour contrast.

SGG VISION-LITE can be used as single laminated glass or doubled glazed laminated glass. The anti-reflective effect is most effective when single laminated glass is used.

Comparison of the light reflectance of SGG VISION-LITE glass with SGG PLANILUX standard glass:

	Simple glazing laminated 8.8		Double glazing 8.8 (15) 8.8	
	RL %	TL %	RL %	TL %
SGG VISION-LITE	1	96	2	93
SGG PLANILUX	8	85	14	76

2- Quality and tolerances

2.1. Durability

- The SGG VISION-LITE coating meets the class A durability criteria of European standard EN1096-2.

2.2. Defects

- The SGG VISION-LITE coating meets the requirements of standard EN 1096-1: acceptable criteria for defects in coated glass (spots, pinholes, punctual defects, scratches).
- Notes: pinholes appear “shiny”, as the glass has a higher reflectance due to the lack of coating. Punctual defects are similar, but are less visible in terms of transmittance than with solar control glass because the light transmittance changes very little. However, an impurity in the lamination is more visible than with a standard laminated unit due to the better visibility through the glass (much lower light reflectance and higher transmittance).

2.3. Tolerances

- The residual reflection has a bluish colour and can vary slightly. This reflection is only visible when the glass is viewed at a certain angle and under certain lighting conditions and where there is a difference in brightness between the exterior and the interior. It depends on the environment.
- This residual reflected colour reduces and virtually disappears when the angle from which the glass is viewed narrows.
- The residual reflection of an SGG VISION-LITE laminated unit is 1%, measured perpendicular to the glass.
- Whatever angle it is viewed from, the reflectance of SGG VISION-LITE glass is lower than that of non-coated glass. It is most effective when the glass is viewed from a perpendicular angle. This effectiveness decreases as the angle from which it is viewed narrows.
- It is essential, particularly for outdoor applications (for example shop windows), to validate the appearance of the glass using a sample. Please contact SAINT-GOBAIN GLASS.

3- General instructions

During factory processing, never place adhesive foil (self-adhesive or different) on the coating of SGG VISION-LITE glass.

Detection of the coating

- It is not easy to mark the SGG VISION-LITE coating. A special coating detector can be obtained from SAINT-GOABAIN GLASS.
- In the absence of a detector, the anti-reflective coating can be detected using the flame from a cigarette lighter and observing the 2 reflections which are perpendicular to the glass:
 - 1st case:** the 2 reflections of the flame are yellow: the glass is uncoated;
 - 2nd case:** the foreground reflection is blue and the background reflection is yellow: the glass has a single anti-reflective coating; the coating is on the side of the flame;
 - 3rd case:** the foreground reflection is yellow and the background reflection is blue: the glass has a single coating; the coating is on the other face;
 - 4th case:** the 2 reflections of the flame are blue: the glass is SGG VISION-LITE with a coating on each face.

The residual reflection of an SGG VISION-LITE laminated glazed unit is 1%, measured perpendicular to the glass.

It is most effective when the glass is viewed from a perpendicular angle.

Never place adhesive foil (self-adhesive or different) on the coating of SGG VISION-LITE. glass.

Labelling

- To identify the SGG VISION-LITE product, it is compulsory to use electrostatic labels which do not leave any adhesive marks.

Handling

- Finger marks and dirt on the SGG VISION-LITE coating, which would require additional cleaning procedures, must always be avoided.
- The glass must always be handled with clean gloves.
- When handling remember that there may be a coating on both faces of the glass.

Processing

- Scratches are visible when viewed from a wide angle (reflected). They are more visible than on SGG PLANILUX clear glass.
- Gloves must be worn when handling the glass
- The coating can be processed on standard machines as long as they are correctly maintained (no rubbing on the coating).
- Regular checks must be made to ensure that anything in contact with the coating (tables, suction cups, transport rollers, protective paper, etc) is clean and free from particles (of glass) which could scratch and damage the coating.
- Do not leave water to dry on the coating (this applies to all steps in the processing). The glass should therefore be rinsed with clean water and dried.

Transporting finished sheets to the site

- Care must be taken to ensure that the SGG VISION-LITE coating is not damaged during transport: either by fixings or being hit by items from the road (gravel), etc.
- Stacks of standard cut sizes are transported in boxes (recommended) or carrying frames:
 - at the top and bottom of the stack:
 - protection using "CELL-AIR" type foam packing sheet
 - between each sheet of glass:
 - protection using Lucite type powder;
 - or soft, neutral (non acid), clean, crease-free interleaving paper;
 - or small non-adhesive cork separating pads (recommended), or with neutral
- the stacks of standard cut sizes are wrapped and protected; desiccant is only used for long journeys when there is a risk of condensation forming between the sheets of glass.

To identify the SGG VISION-LITE product, it is compulsory to use electrostatic labels which do not leave any adhesive marks.

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Care must be taken to ensure that the SGG VISION-LITE coating is not damaged during transport: either by fixings or being hit by items from the road (gravel), etc.

4- Unpacking and handling

- sGG VISION-LITE must be stored in a dry, well-ventilated location. Traces of moisture which have dried on the surface of the glass are very difficult to remove. When loading or unloading, suction cups can be used on the
- sGG VISION-LITE coating, taking the following precautions:
 - clean suction cups;
 - or if preferred, using “CELL-AIR” type foam packing sheet between the suction cup and the sGG VISION-LITE coating. This protection (recommended) prevents the suction cup leaving marks.
- When handling the glass, the sheets must be prevented from sliding against one another; the sheet must be separated from the sheet next to it, before it is lifted up.
- If tongs are used, they must be checked to ensure that they will not damage the coating; clean undamaged rubber.

5- Quality control

- The glass must be checked at the reception stage (see Section 8).
- Once it has been processed, it must undergo a rigorous quality control inspection.
- The inspection includes checking the reflectance and transmittance. Some defects (scratches) are more visible in transmittance; others (pinholes) are more visible in reflection.
- In the case of transmittance, the glass is placed in front of a black and matte background, to which luminous tubes are attached (neon type tubes). The glass is placed at least 300 mm from the tubes.
- In the case of reflectance, use a luminous box consisting of a diffusing opalescent screen with luminous tubes behind it. This luminous surface must be uniform, homogenous and sufficiently powerful. At an approximate angle of 45°, the observer looks at the reflection of this source of light on the surface of the glass.

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The inspection includes checking the reflectance and transmittance. Some defects (scratches) are more visible in transmittance; others (pinholes) are more visible in reflection.

6- Processing

In principle, sGG VISION-LITE can be processed in the same way as any other sGG COOL-LITE Classic type coated glass, as long as the precautions given in this document are observed.

6.1. Cutting on a table

- The cutting table must be meticulously cleaned to eliminate any particles of glass or other materials. It must be kept clean throughout the cutting process. If the glass only has the coating on one face (glass which is to be laminated), then the coating should not come into contact with the table but should be placed with the coating facing upwards.
- Check that the pressure of the air cushion on this type of table is high enough to support the sGG VISION-LITE sheet of glass. If it is not, the coating will be damaged.
- If the installation is fitted with roller conveyors to carry the sheets of glass, they must be examined regularly to ensure that they move freely. A roller which sticks or does not turn correctly may scratch the anti-reflective coating.
- Cutting tables controlled by sensors which react to the reflection of the glass to recognize the presence of the sheet of glass may need to be operated by hand in some cases as the very low level of reflectance of sGG VISION-LITE cannot be detected by the sensor which will then not activate the control systems (this is the case with sensors sensitive to visible light).
- For cutting, products containing too much oil may leave a film of oil which will require considerable meticulous cleaning before processing operations can be continued. It is therefore recommended that evaporating cutting oil is used, such as ACECUT 5250 or ACECUT 5503 oil from Aachener Chemische Werke GmbH (aliphatic hydrocarbon based oil). After cutting, it is advisable to remove any excess oil to prevent any traces of runs which leave marks that are often difficult to remove. Once the sheets have been cut, there must be no friction between the glass blocks (cork or plastic) or soft paper or foam must be placed between the glass.
- Recommendation for lamination cutting tables: use a compressed air gun to remove splinters which appear under the push-pull cutting belt. The push-pull belt must be cleaned. Before cutting, check that the push-pull belt is completely dry (if it is not dry it will leave marks which will have to be washed off).

6.2. Sawing and water jet cutting

- The usual precautions must be taken to obtain a good cut: optimisation of the speed of the blade, condition of the blade, etc.
- Do not leave water to dry on the coating. The glass should therefore be rinsed with clean water and dried.

Never place adhesive foil (self-adhesive or different) on the coating of sGG VISION-LITE. glass.

The cutting table must be meticulously cleaned to eliminate any particles of glass or other materials. It must be kept clean throughout the cutting process.

A roller which sticks or does not turn correctly may scratch the antireflective coating.

Do not leave water to dry on the coating.

6.3. Edgework

- The grinding machine must be meticulously cleaned before being used on SGG VISION-LITE, in particular the parts of the conveyor and all parts which come into contact with the glass. The rollers of the conveyor must not slide on the surface of the glass.
- The water in the self-contained water circuit for the edgework must be changed regularly and at frequent intervals to avoid the presence of too much residue from the edgework (same precautions as for SGG ANTELIO or SGG COOL-LITE CLASSIC coated glasses).
- Immediately after the edgework cycle, the glass must be rinsed with clean water to remove all the edgework residue before moving on to the washing machine. Traces of water from the edgework must not be left to dry on the SGG VISION-LITE coating. Check that there are no runs of grease and oil from the machine. If additives are used in the water (soluble oil, coolant) carry out a test beforehand.
- The following precautions must be taken depending on the type of edgeworking equipment:
 - bilateral: check that the glass is correctly positioned before it is clamped in the holding system of the machine;
 - straight line: the rollers of the conveyor must not slide over the glass;
 - arched edges and digital edgework: no need for any particular protection.

6.4. Notches and holes

- Notches and holes are possible on laminated SGG VISION-LITE as long as precautions are taken not to damage the coating (see Section 3).
- The glass must then be rinsed, as described in Sections 6.2 and 6.3.

6.5. Washing

- The optimum temperature of the washing water is between 35° and 40°C. The quality of the water must be checked (recommendations: neutral pH between 6 and 8, conductivity < 20 µS/cm).
- The machine must be absolutely clean (brushes, etc.). The transportation roller systems must be clean and turn freely and correctly.
- Washing:
 - a prewashing ramp is recommended;
 - cleaning with cerium oxide prohibited;
 - no additives in the water;
 - ensure the water quality has been checked (see above);
 - standard brushes can be used;
 - the distance between the brushes and the glass must be adjusted for the thickness of the glass. Installations in which the positioning of the revolving brushes is automatically controlled by sensors which measure the reflectance of the glass may not detect the glass due to the very low reflectance of the SGG VISION-LITE coating. In this case the brushes will have to be positioned manually;
 - the SGG VISION-LITE glass must not be stationary under the rotating brushes during the washing process.

The water in the self-contained water circuit for the edgework must be changed regularly.

The machine must be absolutely clean (brushes, etc.).

The SGG VISION-LITE glass must not be stationary under the rotating brushes during the washing process..

- Rinsing:
 - it is essential to rinse with clean water (preferably demineralised, conductivity < 20 $\mu\text{S}/\text{cm}$). Otherwise there is a risk of whitish marks caused mainly by limescale.
- Drying:
 - the drying operation is extremely important for the SGG VISION-LITE coating. If the water is not completely dried, it will leave marks, which are very visible to the naked eye (interferential phenomenon). The air must be correctly filtered and a check must be made to ensure that no dust adheres to the glass during this stage;
 - check the condition of the grease nipples of the drive (leaks, etc.);
 - if there are marks on the glass when it leaves the washing machine, they may be cleaned using a soft cloth, alcohol, acetone or diluted ammonia and then dried thoroughly.

6.6. Assembly in insulated glass

- SGG VISION-LITE does not require edge-deletion and can be used with polysulphide, polyurethane or silicone mastics.
- Any traces of sealant remaining on the coating after application must be removed immediately before they harden. They can be cleaned off using a neutral product for windows and soft paper or a soft cloth, or with a clean rubber scraper.
- For enhanced thermal insulation properties the inner sheet of the inner laminated pane can be replaced with a low-emissivity coated glass such as SGG PLANITHERM. The anti-reflective result depends on the low-emissivity coated glass used.

6.7. Assembly in laminated glass

- Glass with anti-reflective coating on one face only is used for the manufacture of laminated glass. This glass is called Semi VISION-LITE. Lamination is always carried out on the glass side. Never have the anti-reflective coating on the PVB side. The coated face can be marked following the recommendations in Section 3. The handling and washing instructions given above must be followed, but the conductivity of the rinsing water must be reduced to 5 $\mu\text{S}/\text{cm}$.
- Before lamination, the glass must be meticulously washed as described in Section 6.5, to remove the roller marks left on the glass side when the SGG VISION-LITE coating is applied on the other face (these marks are subsequently visible under certain lighting conditions).
- The roller conveyor and calendering systems on the production line must be regularly inspected: they must be kept clean, free from any particles of glass, and should rotate correctly so that the SGG VISION-LITE coating is not damaged.
- The PVB sheet must be applied under the highest conditions of cleanliness. The surface of the glass and the PVB film must be thoroughly examined and all particles must be removed before assembly. The SGG VISION-LITE coating makes these particles much more visible than standard laminated glass.
- For autoclaving, the calendered glass must be placed on frames and separated using a product such as Lucite, specifically designed for autoclaving. If the glass is autoclaved in batches, dry, wooden spacers must be used. The autoclave must be cleaned regularly (at least one cleaning cycle a week) to prevent any contamination of the coating.

The drying operation is extremely important for the SGG VISION-LITE coating.

Glass with anti-reflective coating on one face only is used for the manufacture of laminated glass. This glass is called Semi VISION-LITE.

The roller conveyor and calendering systems on the production line must be regularly inspected: they must be kept clean, free from any particles of glass, and should rotate correctly so that the SGG VISION-LITE coating is not damaged.

6.8. UV gluing

Glazing with UV glue should not make contact with the anti-reflective coating. The sealing must be carried out on the glass part of the edges of the glazing (for example on 45° ground edges).

6.9. Lacquering

It is possible to deposit a lacquer on the anti-reflective coating. Always check the compatibility of lacquer with the coating and its adhesion to the coating.

6.10. Processing Restrictions

The following treatments are forbidden when using SGG VISION-LITE anti-reflective glass:

- Any heat treatment; toughened glass or heat-strengthened glass.
- Enamelling or screen-printing of enamel.
- Curving of the glass.

Any heat treatment, toughened glass or heat-strengthened glass, are forbidden when using SGG VISION-LITE or semi VISION-LITE anti-reflective glass.

7- Assembly, installation and maintenance

Please refer to the specific documents which relate to the following areas:

- transporting finished sheets to the site;
- unpacking;
- assembly and installation;
- maintenance and cleaning;
- cleaning products;
- precautions to be taken.

8- Standards and warranty

Standards

The SGG VISION-LITE coating meets the class A durability criteria of European standard EN1096-2.

Warranty

- The SGG VISION-LITE coating is guaranteed for a period of 5 years; a guarantee is given that the anti-reflection function and transparency of SGG VISION-LITE glass will be maintained for a period of 5 years under normal conditions of use and subject to the processing, handling and maintenance guidelines and recommendations mentioned earlier being observed. This performance concerns the light reflectance and transmittance of SGG VISION-LITE glass (average values are given for information only and may be subject to modification).
- Optical quality of SGG VISION-LITE; the optical or colour defects permitted in single glazing are defined in Section 2 “Quality and tolerances” in this document. Optical faults are identified when the glass is received (see Section 5).
- This warranty does not apply to:
 - broken glass or cracked glass;
 - glass which has not been specified, transported, stored, handled, installed, assembled, cleaned, used or maintained in accordance with the instructions given in this document;
 - replacement glass, after expiry of the warranty period for the initial glazing.
- In the event of a complaint, please contact your distributor. If any fault is found by the technical department, SAINT-GOBAIN GLASS will endeavour to supply newly manufactured SGG VISION-LITE glass free of charge, but will not be responsible for the costs of removing and refitting the glazing. The replacement must be delivered to the same place as the initial order.
- This warranty is exclusive and defines the sole responsibility of SAINT-GOBAIN GLASS.

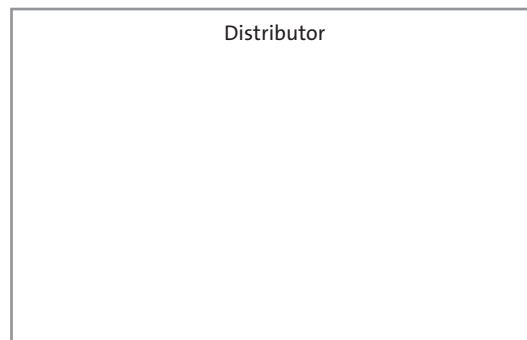
This document contains all essential instructions for the use of
SGG VISION-LITE glass sheets.

All documents previously published by SAINT-GOBAIN GLASS are replaced
by the present document.

SAINT-GOBAIN GLASS has taken every reasonable measure to ensure that
the information contained in the present leaflet was exact at the time of
its publication.

However, SAINT-GOBAIN GLASS keeps the right to modify or add any
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SGG VISION-LITE



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