



CLEARLIGHT LITE AND CLEARLIGHT LITE COMFORT

PROCESSING GUIDE

VERSION 1- JUNE 2023

Your Dreams, Our Challenge

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This version of the guide replaces and cancels all previous versions.
Please regularly check www.agc-yourglass.com for updates.

Field Code Changed

CONTENTS

1. TRANSPORTATION4

2. STORAGE4

3. UNPACKING/HANDLING4

4. PROCESSING5

4.1 Cutting6

4.2 Edge processing6

4.3 Washing6

4.4 Silkscreen printing7

4.5 Heat treatment7

4.6 Bending8

4.7 Assembly in insulating glass units8

4.8 Recommended spacers.....9

5. MAINTENANCE AND CLEANING.....9

5.1 Cleaning method.....9

5.2 Precautions when cleaning.....9

5.3 Cleaning tools10

6. APPEARANCE.....10

7. ADDITIONAL INFORMATION.....12

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1. TRANSPORTATION

Care must be taken to ensure that the ClearSight Lite and ClearSight Lite Comfort coatings are not damaged during transport, e.g. not scratched by fixings and not struck by gravel/sand/salt from the road.

2. STORAGE

ClearSight Lite and ClearSight Lite Comfort must be stored in a dry, well-ventilated area. It is difficult to remove traces of moisture created on the glass surface.

There is no specific shelf life for ClearSight Lite and ClearSight Lite Comfort .

3. UNPACKING/HANDLING

- When loading or unloading, suction cups can be used on the coating. They must be cleaned before loading/unloading.
- When handling ClearSight Lite and ClearSight Lite Comfort, always wear clean gloves that do not leave sweat, dirt, grease residues or fingerprints on the coating.
- When handling ClearSight Lite and ClearSight Lite Comfort, care must be taken to ensure the glass sheets do not slide against each other. Before being lifted, each sheet must be separated from the next sheet.

How can I determine which side of ClearSight Lite is coated?

- The glass is coated with an anti-reflective coating on both sides.

How can I determine which side of ClearSight Lite is the tin side?

- Use the Bohle TinCheck device as shown in the picture.
- Regardless of calibration, the highest value displayed will indicate the tin side.
- For information, during the tempering process, the tin side faces the rollers in the furnace



How can I determine which side of Clearsight Lite Comfort is coated?

- The glass is coated on both sides. One side is coated with an anti-reflective coating and the other side has an anti-reflective and low-e coating.
- The easiest way to determine the side with the low-e coating is to use a simple coating detector for electrical conductive coating, as shown below, or any equivalent device.



Coating detector for sale on the AGC store: <https://www.agc-store.com/en/accessories/agc-low-e-coating-detector>

4. PROCESSING

Throughout post-processing:

- Clean gloves must always be worn when handling the glass.
- Clearsight Lite and Clearsight Lite Comfort can be processed on standard processing machines provided they are maintained correctly and provided that anything which comes into contact with the coated surface is clean and free of any glass particles or other materials which can damage or scratch the coating.
- Scratches can be checked more easily when viewed with reflected light rather than transmitted light.

Important recommendation

Since the Clearsight Lite and Clearsight Lite Comfort coating may be on either one or both sides of the glass, it may be difficult for standard optical sensors to detect the coating during handling and/or processing (cutting, grinding, printing, etc.). This is perfectly normal. Consequently, all equipment must be checked and appropriate sensors used.

Make sure to always check and set up your equipment correctly. Below is a list of technical options that have already been tested and proven to work with glass that has the Clearsight coating:

Type of check / sensor		Examples of approved tools
automatic	photocell detection	Wenglor ZW6003, Omron E3S-LS20XB4
	optical sensor	Keyence
	photoelectric sensor	Banner type S18SP6DQ
	ultrasound sensors	SonicTube UC4, Nr. 5329249, UC4-13341S01
manual	mechanical switches instead of optical	Schneider ZCK-E08

4.1 Cutting

- The cutting table must be cleaned to eliminate any glass particles or other materials. Clean the table surface before cutting each new glass sheet.
- Keep the air cushion pressure on this type of table high enough so as not to damage the coated surface.
- If roller conveyors are used to carry the glass sheets, they must be checked regularly to ensure they move smoothly. A roller which sticks or does not turn smoothly can scratch the coating. If the cutting table is controlled by glass sensors which react to visible light reflection from the glass, the sensors may not recognise the presence of Clearsight Lite and Clearsight Lite Comfort glass due to the extremely low reflection.
- AGC recommends using the Keyence FS-V21RP optical sensor, or equivalent (see table above).
- Too much cutting oil may leave an oily residue or traces on the coating. This requires meticulous cleaning before moving on to the next process. It is therefore recommended that Clearsight Lite and Clearsight Lite Comfort be cut dry or with as little evaporating cutting oil as possible.
- Edge cutting: For stock sheets an edge-cut of 2 cm on all sides must be applied.
- No edge deletion is required.

4.2 Edge processing

- The grinding machine must be meticulously cleaned before processing glass, especially the conveyor rollers and any other parts which might come into contact with the coated surface. The rollers must not slide on the coated surface.
- The water for the edge processing must be changed regularly to avoid water residue from the edge processing.
- The glass must be rinsed with clean water to remove water residue immediately after edge processing. No water must not be left to dry on the coating.
- Check that there are no traces of grease or oil from the machine.

4.3 Washing

- Use water that is warm (temperature between 35 and 40 °C) and clean.
- The washing machine, especially the bristles and the conveyor rollers, must be clean.
- The rollers must turn freely and correctly.
- Clearsight Lite and Clearsight Lite Comfort glasses must not stand still under the brushes in the washing machine.
- No abrasive materials, including cerium oxide, may be added to the water.
- Washing machines with standard cylindrical brushes fitted with soft plastic bristles (diameter $\leq 150 \mu\text{m}$) are suitable.
- The distance between the brushes and the glass must be adjusted carefully depending on the glass thickness.
- The glass must be rinsed with clean water to remove residual water. Otherwise, there is a risk of water traces due mainly to limescale deposits.
- The glass must be washed in clean, deionised water with a pH of 7 (± 1) and a conductivity of $<50 \mu\text{S/cm}$.
- No hard particles (such as calcium) or acidic/detergent agents should be present in the water used for washing and rinsing as these may damage the coating.
- Dry immediately after washing in order to prevent water residue on the glass, which can cause water spots.
- If there are marks, traces or spots on the glass, clean carefully using a soft cloth with alcohol (not denatured alcohol) and then let dry.

4.4 Silkscreen printing

Clearsight Lite and Clearsight Lite Comfort can be used for silkscreen printing, roller coating or digital printing, as long as the instructions given below are followed:

- Any impurities on the upper surface to be printed can be removed using a compressed dry-air jet.
- If the enamelled area comes into contact with the IGU sealants or any other kind of sealant, a compatibility test must be carried out
- After silkscreen printing, roller coating or digital printing, the decorated glass must be heat treated.

The final appearance will depend on the colour and type of enamel used and the desired pattern. The processor will have to carry out preliminary tests on a case-by-case basis in order to evaluate the final appearance. Under no circumstances can AGC be held liable for the outcome of the operation. The presence of enamel on the coating changes the optical and energetic properties of the final glass product. These performance properties can be obtained from our Technical Advisory Service (tas@agc.com).

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4.5 Heat treatment

- Clearsight Lite and Clearsight Lite Comfort have been designed to undergo a heat treatment (thermal toughening/heat-strengthening)
- For Clearsight Lite, AGC recommends placing the tin side on the furnace rollers.
- For Clearsight Lite Comfort, the low-e coated side should be face-up.
- In all cases, the rollers must be as clean as possible.

Heat treatment settings for Clearsight Lite

- Clearsight Lite does not have low-emissivity properties. This means that, theoretically, there is no need for a convection system. Nevertheless, if the furnace rollers are not perfectly clean and since the glass usually tends to become slightly concave during the early stages of the heating process, a light convection on top will be helpful to prevent the formation of 'white haze' in the centre of the glass.
- The oven temperature must not exceed 680 °C.
- The heating time is similar to that for standard clear float glass.
- The same applies for the quenching settings.
- A kite mark can be applied to the coating.

Heat treatment settings for Clearsight Lite Comfort

- The oven temperature must not exceed 680 °C.
- As written above, the low-e coating should preferably be face-up. Since the coating has a low-e effect on the top side of the glass, the upper radiation of the furnace will be partially reflected by the coating and will cause a lack of absorption of the upper glass surface.
- Therefore, some convection on the top will be necessary.
- AGC recommends setting the top convection pressure to 15% of the maximum value.
- If the glass becomes concave ('smiling') inside the oven, increase the pressure.
- If the glass becomes convex ('sad'), decrease it.
- The heating time will depend on the oven's convection efficiency.
- As a first approximation, the heating time will be 25% longer compared to standard clear float glass. This can be fine-tuned depending on the glass temperature as it exits the oven, depending on the direction of the rollers (i.e. whether the rollers move lengthwise or widthwise with respect to the sheet of glass) and/or depending on any visual deformations caused by and inherent to the heating process and the position of the rollers.
- The settings for the quenching section are the same as for standard clear float glass, with a

- bit more air pressure on top due to the presence of the low-e coating.
- o A kite mark can be applied to the coating.

- All handling operations (loading and unloading the furnace) must be performed according to the recommendations set out in section 3 of this document.

Deleted: Note: For the European Union, IGUs must be CE marked in accordance with EN 1279-5. Under EU regulations, all the requirements set out in these standards (ITT, FPC, etc.) must be met by the processor

4.6 Bending

In our experience with other similar products, bending ClearSight Lite and ClearSight Lite Comfort is technically possible. Nevertheless bending tests have not been carried out internally, which means we cannot guarantee the minimum radius, aesthetic results or final properties during and after bending. Bending trials must be carried out by the processor.

The technical settings (cycle times, temperatures and so forth) were noted during tests on certain types of bending equipment and obviously depend on the individual characteristics (shape, strength, convection rate and so on) of the equipment.

To help you on how to proceed, we can assume that the annealed version of ClearSight Lite and ClearSight Lite Comfort can be bent using the same settings as for Planibel Clearlite of the same thickness. To bend tempered ClearSight Lite and ClearSight Lite Comfort, the furnace settings must be adjusted in the same way as for flat tempered glass.

For additional information, please contact AGC's Technical Advisory Service (tas@agc.com).

4.7 Assembly in insulating glass units

- ClearSight Lite and ClearSight Lite Comfort are designed to be assembled in insulating glass units without any specific restrictions regarding the coating positions.
- The ClearSight Lite and ClearSight Lite Comfort coatings must be compatible with the sealing products used. Each processor is responsible for testing the compatibility and adherence of its assembly and sealants.
- No edge-deletion is required.
- Since ClearSight Lite and ClearSight Lite Comfort are highly neutral in appearance, AGC recommends indicating the external surface after assembly to ensure that the units are installed correctly.
- If ClearSight is combined with other coated glass products, AGC recommends that the processor first manufacture some mock-up samples in order to assess and validate the aesthetics of the final product.

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Note: For the European Union, IGUs must be CE marked in accordance with EN 1279-5. Under EU regulations, all the requirements set out in these standards (ITT, FPC, etc.) must be met by the processor.

4.8 Recommended spacers

- **During processing**

Product description: Vitokork soft cork disks with micro suction pads (3x20x20 mm)
Supplier: VITO Irmen GmbH & Co. KG
Postfach 1720
53407 Remagen - Germany
Mittelstraße 74-80,
Tel.: +49 (0) 2642 4007-0
Fax: +49 (0) 2642 42913
info@vito-irmen.de
www.vito-irmen.de

- **After IGU assembly**

The same spacers described above can be used.

If there is a risk of damage to the IGU surface after IGU assembly (transportation, handling, setting on frames or other on-site operations), see section 5.4.

Quality control: See section 7 below.

5. MAINTENANCE AND CLEANING

5.1 Cleaning method

- Clearsight Lite and Clearsight Lite Comfort must be cleaned with water, whether installed indoors or outdoors.
 - 1) To remove dirt stuck to the glass, wet the glass with a moistened sponge or soft cloth.
 - 2) Clean with a cloth soaked in diluted detergent or a rubber squeegee.
 - 3) Wipe with a dry cloth.
- Use a neutral detergent to remove tough stains.
 - 1) Soak a soft cloth with diluted detergent.
 - 2) Follow the detergent manufacturer's instructions about density.
 - 3) When wiping away solid materials, apply only gentle pressure to the glass.
 - 4) Clean with a cloth soaked in diluted detergent or rubber squeegee.
 - 5) After cleaning with water, wipe with a dry cloth.
- We recommend using a rubber squeegee to clean the glass thoroughly and to wipe away wiping marks as well.
- Fingerprints can be wiped off using a soft cloth with alcohol (not denatured alcohol) or glass detergent. Do not use rags or cleaning detergents which contain abrading agents.

5.2 Precautions when cleaning

- When using a rubber squeegee, take care to ensure that the metal handle does not come into contact with the glass.
- The glass will not be damaged when wiped with a cloth, but it will be damaged if scratched with a hard material.
- The glass will be damaged if there is any dirt or solid material between the glass and the cleaning implement. Remove any dirt or solid material when cleaning.
- Wipe off the detergent after cleaning.

5.3 Cleaning tools

- Use the following tools and substances for cleaning:
 - sponge
 - water
 - soft cloth
 - alcohol
 - rubber squeegee
 - neutral detergent
- Do not use the following materials or substances, as they may scratch or deteriorate the coating:
 - abrasive sponge (sponge made from melamine resin)
 - steel wool
 - metal squeegee
 - strong acid
 - alkali detergent
 - abrasive detergent
 - water-repellent detergent
 - denatured alcohol

6. APPEARANCE

Defects in Clearsight Lite and Clearsight Lite Comfort are characterised by European Standard EN 1096-1.

Defects affecting appearance are:

- a) specific to the glass substrate
- b) specific to the coating

If a defect specific to the glass substrate is more visible because of the coating, it will be treated as a coating defect.

Detecting defects

Defects are detected visually by observing the coated glass in transmission and/or reflection. An **artificial sky or daylight** may be used as the source of illumination.

An artificial sky is a flat surface that emits diffuse light with a uniform brightness and a general colouring index Ra higher than 70 (see CIE 013.3-1995).

This is achieved by using a light source whose correlated colour temperature is in the range between 4000 K and 6000 K. In front of the arrangement of light sources is a light scattering panel that does not have spectral selectivity. The illuminance level on the glass surface must be between 400 lx and 20000 lx.

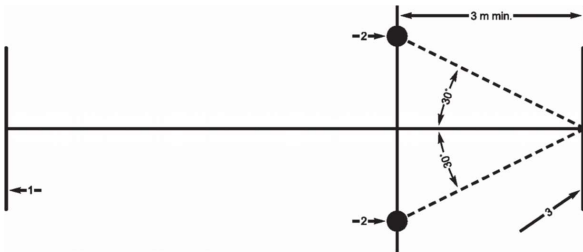
Daylight illumination is a uniform overcast sky with no direct sunlight.

Examination conditions

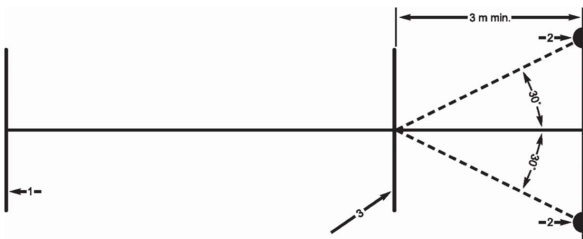
Coated glass may be examined in stock size plates or in finished sizes ready for installation. The examination may be conducted in the factory or on-site when glazed.

The pane of coated glass being examined is viewed from a distance of at least 3 m. The actual distance will depend on the defect being considered and which illumination source is being used. When examining the coated glass in reflection, the observer looks at the side that will be the outside of the glazing. When examining the coated glass in transmission, the observer looks at the side that will be the inside of the glazing. During the examination the angle between the normal to the surface of the coated glass and the light directed to the observer's eyes after reflection or transmission by the coated glass must not exceed 30°.

Reflection:



Transmission:

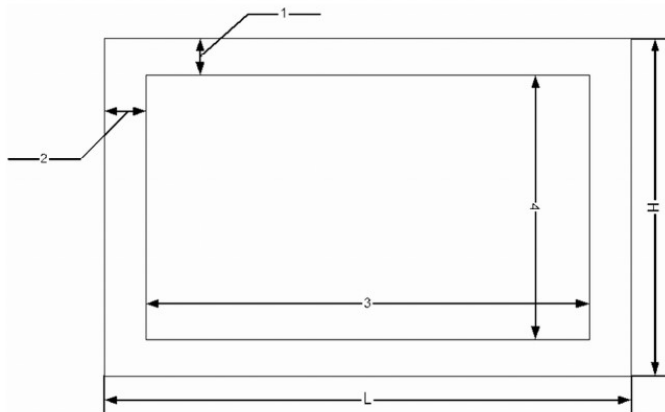


Key

1 illumination source 2 observer position 3 coated glass sample

For panes of coated glass in finished sizes ready to be installed both the main area and the edge area of the pane must be examined.

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Key

1 edge area height is 5% of H dimension 2 edge area length is 5% of L dimension
3 central area length is 90% of L dimension 4 central area height is 90% of H dimension

Table 1 — Acceptance criteria for coated glass defects

DEFECT TYPES	ACCEPTANCE CRITERIA		
	PANE/PANE	INDIVIDUAL PANE	
UNIFORMITY/STAIN	Allowed as long as not visually disturbing	Allowed as long as not visually disturbing	
PUNCTUAL	Not applicable	MAIN AREA	EDGE AREA
Spots/Pinholes; > 3 mm		Not allowed	Not allowed
> 2 mm and ≤ 3 mm		Allowed if not more than 1/m ²	Allowed if not more than 1/m ²
Clusters;		Not allowed	Allowed as long as not in area of through vision
Scratches; > 75 mm		Not allowed	Allowed as long as they are separated by > 50 mm
≤ 75 mm		Allowed as long as local density is not visually disturbing	Allowed as long as local density is not visually disturbing

Important remark

Due to the extremely low light reflectance of Clearsight Lite and Clearsight Lite Comfort, the colour of the glass is, by its very nature, barely visible and difficult to measure. However, depending on observation conditions and lighting, colour differences within the same glass pane or between different panes may be visible. Such differences are inherent to the product. Accordingly, the requirements set out in standards such as ISO 11479 or documents such as the Code of Practice for in-situ Measurement and Evaluation of the Colour of Coated Glass used in Façades issued by Glass For Europe, which were defined for reflective glass coatings, do not apply.

7. ADDITIONAL INFORMATION

Clearsight Lite and Clearsight Lite Comfort should be viewed at a 90° angle. The coating is applied so that it can work most effectively when viewed straight on. This means about ≤1% of the residual reflection is achieved at a right angle (90° angle) to the glass.

Clearsight Lite and Clearsight Lite Comfort reflect less than normal uncoated glass even at lower angles to the glass, but the effectiveness of anti-reflection decreases as the angle decreases.

The residual reflection is greenish and can vary as the angle changes. This reflected colour can be more noticeable depending on the surrounding environment, including lighting conditions, viewing angles, etc.

These reflections are normal with anti-reflective (AR) coatings (similar to AR coatings for eyeglasses). However, the appearance of the glass – and especially its colour – should be validated using samples if needed.

The Clearsight Lite and Clearsight Lite Comfort coating shows dirt very clearly. We recommend carefully and periodically cleaning the glass using a soft cloth with alcohol (not denatured alcohol) or water containing a neutral detergent.

Do not apply any stickers to the glass as they could damage the coating when removed.

Clearsight Lite and Clearsight Lite Comfort cannot be repaired if scratched.

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¹Recommended coating detector

Product description: RX 1550 RefleX Programmable Coating Detector

Supplier: EDTM, INC.

<http://www.edtm.com/>

Telephone: (419) 861-1030, Fax: (419) 861-1031, email: sales@edtm.com