A low-angle photograph of the Burj Khalifa skyscraper in Dubai, showing its iconic tiered design and glass facade. The building rises vertically against a clear blue sky with some light, wispy clouds near the horizon. The lower portion of the image is partially obscured by a dark blue curved banner.

Processing Guidelines Guardian ClimaGuard™ Neutral 70

Guardian ClimaGuard™ Neutral 70

Processing Guidelines

Guardian ClimaGuard™ Neutral 70 is a low-emissivity glass with a silver containing coating. This document is intended to provide information about suitable practices for handling/processing **Guardian ClimaGuard™ Neutral 70** product.

ClimaGuard™ Neutral 70 Shelf-Life:

Guardian ClimaGuard™ Neutral 70 must be processed within the shelf-life timeframes specified below. All storage conditions to apply during the shelf life.

The shelf life after delivery to the **first buyer from Guardian** is the following:

ClimaGuard™ Neutral 70

Taped pack - **packs with desiccant protected by sealing tape.**
Shelf life is **maximum 6 months** without pack being open.
Packs that were opened but not consumed completely must be re-sealed.

Internal Storage:

It is highly recommended to store the product at internal storage. And it is free from roof leak, wet and chemical. Avoid storing it in open space/coating expose to atmosphere.

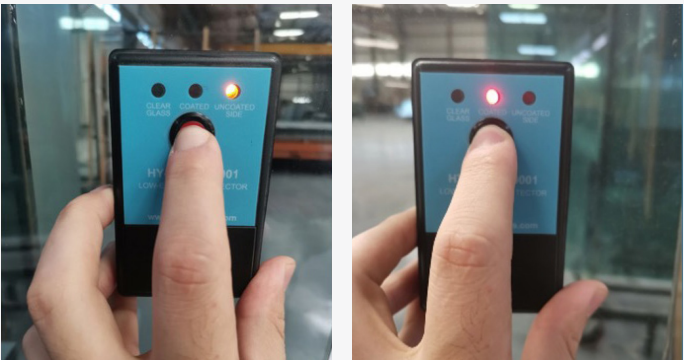


Handling:

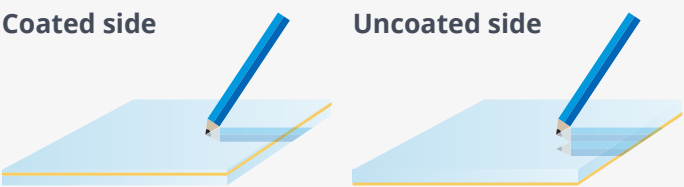
- Standard glass handling equipment can be used when processing **Guardian ClimaGuard™ Neutral 70**.
- Always wear suitable personal protective equipment (clean safety gloves, safety glasses, etc.)
- Any mechanical or chemical impact on coated surface can lead to coating damage.
- Any marks, scratches, dirt, fluid droplets or fingerprints from gloves on the coating can lead to irreversible defects. These defects become particularly evident after heat treatment.
- Avoid any contact between the coating and hard objects and equipment (glass splinters, glass edges, metallic parts, abrasive particles, etc.)
- Any appliances that come into unavoidable contact with the coatings should be cleaned frequently. Do not drag templates, measurement tools or other metal objects across the surface.
- Do not stick, glue or write on the coating with any materials (adhesive labels, wax crayons, etc.). Contact with the coating or TPF should be avoided with any kind of chemicals. If suitable fluids are applied, the surface should be washed immediately.
- Any impact on the edges of the glass should be avoided, as this may decrease glass durability.
- The direct contact of the suction cup with the coating should be avoided whenever possible.
- In case of unavoidable contact with the coating, the suction cup surface should be perfectly clean, dry and free of any lubricants.
- Do not drag suction cups on the coating surface.
- It is recommended that suitable, clean protective covers on the cups (overshoes) are used.
- Covers decrease the risk of presence of any abrasive or chemically active particles. The white color of the covers typically used makes it easier to visually assess their conditions.

Identification of Coated Side:

During processing, it is necessary to identify the coated side of the glass. Do not touch the glass surface to identify the coated side. It is recommended to use coating detector to identify the coated side of the glass at every stage of glass processing.



Place a pencil or similar pointed object against the surface within 10mm of the edge to prevent visible damage of the coating. On the coated surface, a single well-defined reflected image will appear. Against the uncoated surface, two images appear.



Cutting:

- Avoid cutting by hand with tools such as rulers or templates. If the needs to should be cut using a template, place a protective sheet of acid-free paper between the template and the glass.
- Coated surface should not be touch on cutting table and always keep the cutting table free from chips or any other material which damage the coating.
 - Only minimum required amounts of cutting fluid are recommended.
 - No fluid should remain for a long time on the coating in order to prevent chemical reaction and damage of the coating or difficulties during the washing process.
 - Cutting fluids should be cleaned immediately after cutting from the surface and from the edges if needed.
 - If the glass panes are stacked just after cutting, separation is needed to facilitate evaporation of the cutting fluids.

Cleaning:

WASHING AND CLEANING:

Standard glass washing machines can be used when processing **Guardian ClimaGuard™ Neutral 70**. However, there are specific details to be considered.

- Any mechanical or chemical impact on coated surface can lead to coating damage.
- The washing machine must be checked and maintained at regular intervals to ensure it is perfectly clean and operating correctly.
- Always use clean and de-ionized water ($< 30 \mu\text{S}$) as close to neutral acidity as possible ($\text{pH } 7 \pm 1$).
- The water must not contain any cleaning agents or non-dissolved particles (such as lime).
- Abrasive cleaning agents can scratch or damage the coatings and must be avoided.
- Standard washing machine brushes are not suitable for coatings. The brushes with \varnothing of bristles max. 0.15 to 0.20 mm are recommended for all Guardian coatings.
- Fixed brushes at the machine entry or exit must be adjusted to not contact the coated surface.
- The brushes should be set to a maximum 1-2mm contact with the coated surface.
- During washing the panes must not remain stationary in the machine with the brushes revolving.
- The brushes should be cleaned frequently and have an ample supply of water; the brushes must not operate dry.

AFTER WASHING:

- Carry out a visual inspection in both transmission and reflection with suitable lighting.
- After washing, the coating should only be touched with suitable clean gloves.
- The glass panes must exit the washing machine completely dry, otherwise drying traces (watermarks) will remain later.

There must not be any scratches, dirt, watermarks or residues, fluid droplets or fingerprints from gloves on the coating. Otherwise, these can lead to irreversible defects, particularly evident after heat treatment.

MANUAL CLEANING:

When spot cleaning of the coating is required, dab or blot the surface with a clean, soft cloth to remove any excess cleaning solution. Do not wipe the surface. Guardian recommends the use of mild fast-drying household glass cleaners, e.g. a mixture of approx. 10% ammonia and 90% water or a mixture of approx. 50% isopropyl alcohol and 50% water. Do not try to wipe out the small glass particles from the surface, as these must be blown off by dry and clean air.

Heat Treatment:

Guardian ClimaGuard™ Neutral 70 can be processed as fully tempered or heat strengthened glass. The capability of equipment to process fully tempered glass does not necessarily mean it has the capability of processing into heat strengthened glass. Settings adjustment is necessary, particularly in the cooling section.

SO₂ (Sulphur dioxide) must not be used at any time during the heat treatment of **Guardian ClimaGuard™ Neutral 70**. The SO₂ flow must be discontinued at least 2 hours prior. Avoid any traces of SO₂ in the furnace. It is recommended that roller waves will be oriented horizontally on the facade.

Uniform heating: Whole surface uniform heating and cooling are critical in order to obtain good optical quality of heat-treated coated glass. A non-uniform process in the furnace can lead to permanent deformations and glass breakage.

Lamination:

Until further notice, **Guardian ClimaGuard™ Neutral 70** coating is considered non-compatible with PVB interlayer.

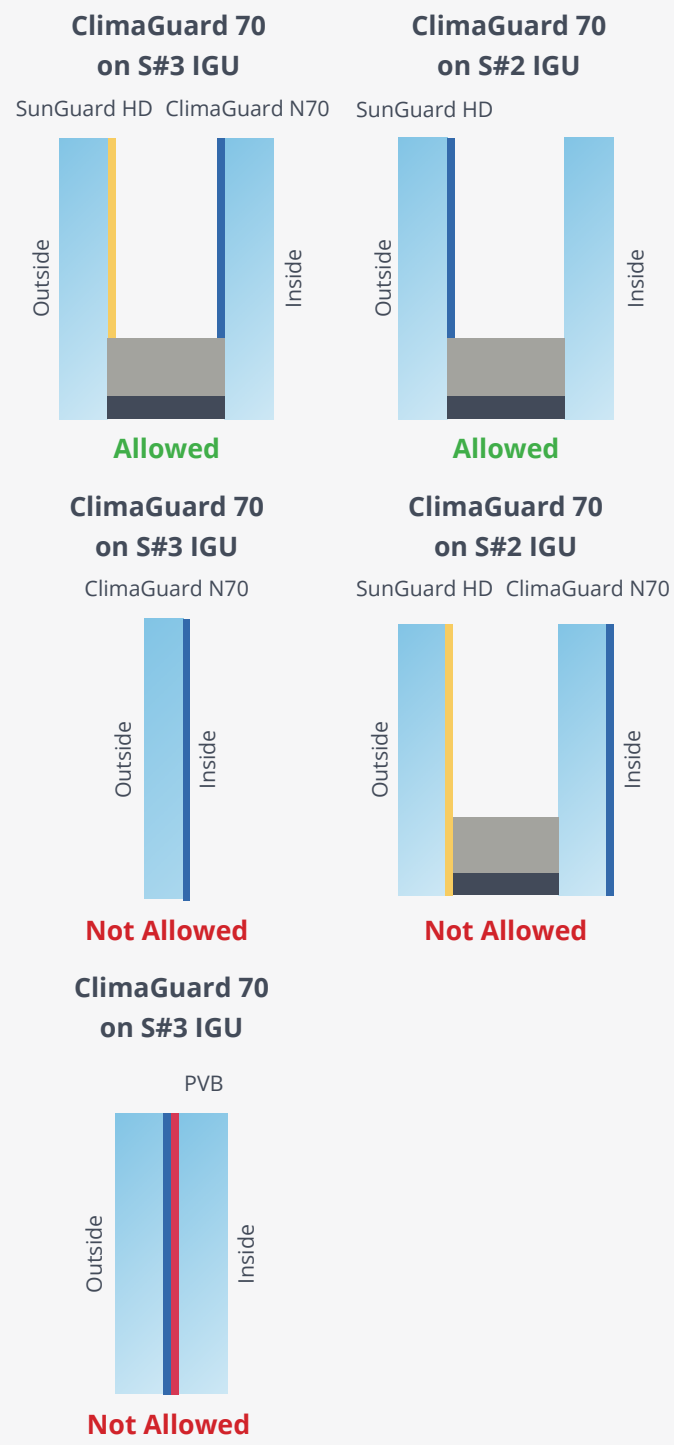
Transportation of Separate panes outside of Processing site:

- Any transportation of **Guardian ClimaGuard™ Neutral 70**, outside the factory environment is strongly not recommended.
- Any subsequent processor of the glass must be informed about the special requirements of processing of Guardian coated glass and must follow all guidelines described in this document.
- Any subsequent processor must be informed about the processing time and how many hours the glass has already been in processing.
- The coated surface requires quality control at the receiving site for checking any coating damage and corrosion under suitable light conditions.

General recommendations that can decisively determine the quality of the process:

- All storage and handling requirements should be followed before and during transportation as well as during further processing.
- Any movement or rubbing of the panes against each other must be avoided during transit and loading / unloading of the glass.
- Transit and storage times should be kept as short as possible.
- Glass must be hermetically sealed within a very short time after processing.
- Glass-to-glass contact must be avoided.
- An uncoated cover pane should be used to protect the coatings when transporting a full or partial pack.

Coating orientation in the glazing:



Processing Time:

After the start of processing, the **Guardian Climaguard™ Neutral 70** must be processed as soon as possible within a maximum of 24 hours (Cutting to IGU making).

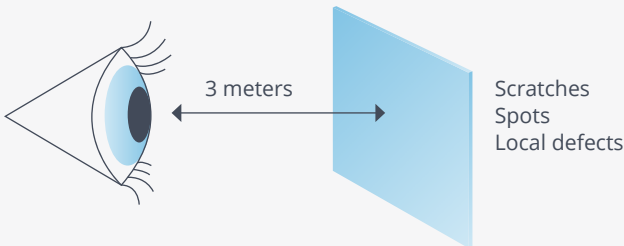
Quality and Compliance:

The glass requires a quality control after each processing step under suitable light conditions to detect as early as possible any quality deviations.

Some important examination conditions according to EN 1096-1:

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

- The pane of coated glass being examined is viewed from a minimum distance of 3 meters.
- The angle between the normal to the coated surface and the light beam proceeding to the eyes of the observer after reflection or transmission shall not exceed 30°.
- The examination of the coated glass in reflection is performed by the observer looking at the side which will be the outside of the glazing.
- The examination of the coated glass in transmission is performed by the observer looking at the side which will be the inside of the glazing.



It is not the responsibility of Guardian to ensure that the intended application is appropriate and complies with all relevant laws, regulations, standards, codes of practices and other requirements.

Important Notice to Traders:

To ensure optimal performance and adherence to best practices, it is essential that this Processing Guidelines document is shared with your customers whenever they purchase our glass products. This will help them properly understand the necessary handling and processing requirements to maintain the quality and integrity of the product.

Verification

The signature below verifies that the customer has read and understands the full content of Guardian Climaguard™ Neutral 70 Processing Guidelines.

Name/Signature:

Title:

Company/Stamp:

Date:

Please return this page signed via e-mail at fcesupport@guardian.com

Please contact your local Guardian Representative or your local Technical Advisory Center for further information.

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The guidelines contained herein are for information purposes only and are not intended to be a comprehensive set of instructions but assume the processor has professional knowledge of glass processing.

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