

1 Introduction

Soft coatings by arcon contain at least one silver function layer and are produced by the magnetron process. The finished product is used in insulating glass units.

In order to process coated glass products for their best performance processing guidelines as detailed in this document must be followed.

This document contains processing guidelines including information on specific steps for surface detection, handling and storage, glass cutting, machine washing, insulating and storage.

This document is permanently reviewed and updated. The latest version can be downloaded on the internet at www.arcon-glas.de.

Special requirements have to be taken into consideration for heat treatable coatings which are described in the "Guidelines for processing heat treatable arcon coatings".

Furthermore the regulations given in "Technical Specification for arcon Coatings" should be considered.

Ignoring and non-compliance can result in damage to coated surface.

2 Package and storage

Coated glass products by arcon are delivered in all commonly used packages. Sizes are available in jumbo stock sheets are 3210 mm x 6000 mm, split size of 3210 mm x 2250 mm and special dimensions (e. g. 3210 mm x 5100 mm). In addition to the standard dimensions, panes can also be supplied with customer-specific dimensions in float glass, tempered glass, heat-strengthened glass and laminated glass. The available thicknesses are 4, 6, 8, 10 and 12 mm on clear and tinted glass substrates.

The first pane in the package is an uncoated float pane that is used for protecting the coated surface. The subsequent panes are positioned in a manner that the coated surface faces the first float pane. The position of this float pane is clearly marked on the package label according to the customer's request (on the front or rear side). A special powder (PMMA type with qualified grain size) is applied as a separating agent between the individual panes to avoid damage during the transport.

All coated glass products by arcon must be stored in constant conditions. Relative humidity may not exceed 70 per cent. All coated glass products by arcon must not be exposed to condensation. Open air storage must be avoided.

Coated glass products by arcon are sealed for long transport distances to avoid condensation on the exposed glass surface and inside a glass pack during transport. Moisture can affect the coating immediately and the coated surface will become corroded. Hence the seal should remain closed until the product is used for processing. If not all glass sheets will be used after opening it is recommended to seal the package again. A sufficient distance to washing machines, external doors and chemicals (e. g. NaCl, HCl intended to be used for water preparation plants) has to be maintained.

Coated glass products by arcon can be stored in their original package under normal conditions up to 6 months. Opened stacks should be processed within 2 month. However, first in first out principle should be adopted.

All boxes must be inspected for any damage on arrival and damages reported and recorded for potential insurance claims etc. Damages and defects should be reported to arcon and this glass should be stored for inspection by arcon representative.

3 Labelling and traceability of packaging units

Each packaging unit is labelled with a tag containing a consecutive number, coating name, glass thickness, dimensions, number of jumbo as well as split sizes and the position of cover sheet. arcon coatings are in accordance with the harmonized European standard EN 1096 and therefore CE marked.

The package label must be kept since data are required for any warranty claims.

4 Identification of the coated side

During all processing steps it is important that the coated side remains towards the air side i.e. not facing cutting pad or conveyor systems. Coating can be clearly identified by using a coating tester or ohmmeter. Coating testers can be purchased from arcon.

5 Handling

Before processing all plant workers have to be informed about special requirements for arcon soft coatings as well as trained in its handling.

During each processing step marking-free clean gloves must be used. Lubricants, oils, liquid drops or finger and glove prints can cause irreversible imperfections. Therefore, any kind of soiling must be avoided. Glass cutting pads should be frequently cleaned by compressed air to avoid scratches on the glass surface.

An additional risk is the use of vacuum cups on the coating. The vacuum cups should not be in contact with the coated surface when unstacking the glass sheets. However, if the manufacturing process requires the use of vacuum suction systems it must be ensured that they are always absolutely clean and silicone free. Therefore, we recommend the use of special protective covers for them.

Separators (e.g. cork) can leave irreversible prints on the coated surface. The coated side must not be marked or labeled.

All devices and tools which come into contact with coatings must be kept permanently clean.

6 Cutting and cutting oils

To avoid damages caused by scratches, glass splinters or dirt, the coated glass surface must remain towards the air side during cutting and all other processing steps. Only soft cutting fluids that can easily be removed during the washing process are to be used for the cutting procedure. Avoid all excess of cutting fluid and remove any residual glass splinters or dust from the cutting table. Rulers or templates for cutting the glass should be avoided in order to reduce risk of scratches.

The cutting table must be cleaned regularly by using compressed air.

7 Edge deletion

Edge deletion is required for all arcon coatings to ensure a functional insulating edge seal.

Edge deletion could be on line during cutting or prior to insulating respectively manually using hand held grinding systems. Suitable grinding wheels have to be used (recommendations are given in chapter “production aids”). Parameters are to be adapted (rpm, rate of feed, grinding pressure).

arcon recommends soaking off the wheel swarf to avoid the scratching of the panes by fine glass splinters in the follow processing steps. The effectiveness of edge deletion can be checked by using coating testers.

In order to achieve proper surface quality, fixed sizes can be masked with an adhesive tape before the coating process. This adhesive tape must be removed before IGU assembling.

8 Washing process

Coated and uncoated panes have to be washed before assembling. When washing the glass the following specific aspects are to be taken into consideration.

- The coated glass surface must not be moved directly on the transport rollers.
- It is necessary to use clean demineralized water (conductivity < 30 μ S/cm, pH value 6.0 – 7.5). Washing agents must not be used.
- A water temperature of + 30°C is recommended.
- The brushes directly in contact with the coating must be particularly suited for coated glass (bristle diameter at least of 0.15 – 0.20 mm) to avoid scratches on the coating.
- Ensure the best possible continuous flow of production to avoid scratches on the coated surface if the washing process is stopped and restarted on one pane.
- Leaving the washing machine the panes must be completely drying to avoid remaining water- drip stains on the coating.
- After the washing process, the glass should be visually inspected at the test station using an appropriate illumination in transmittance and reflectance.
- Rubber lips or brush bars must not rub against the coated surface and should be removed if necessary.

The washing machine is to be maintained at regular intervals. During this inspection particularly the brushes are to be checked for their cleanness and correct adjustment. The washing water must be renewed regularly.

To remove stains use a mild, quick-drying cleaning agent. For this purpose, dab the surface carefully with a clean, soft cloth without applying any pressure onto the coating. Cleaning agents must not remain on the coated surface.

Recommendations for cleaning agents are given in chapter “production aids”.

9 IGU assembling

All arcon soft coatings must be used as insulating glass units (IGU) and the coating must face the space between the panes. The inner space is filled with dry air or an inert gas. In order to achieve their best performance arcon sunbelt products must be placed on #2 surface of an IGU and low-e coatings on #3 surface of an IGU. Their monolithic use is not allowed.

The edge seal of an IGU consists basically of a two-stage sealing system – the butyl as the primary sealant, and a secondary sealant. This permanently elastic edge seal must take up the strain exerted upon the IGU and ensure that the IGU remains airtight and gastight respectively throughout its lifetime.

The processing guidelines of the sealant manufacturer need to be followed.

Air-filled and gas-filled IGU must comply with the EN 1279 family¹. There are different types of gas-filling techniques on the market. The most modern and rational gas filling technique is the on-line filling. Filling gases are argon, krypton and mixtures.

The edges of coated fixed sizes in IGU units can be coated for technical reasons. This coating residues corrodes by and by.

After assembling, the glass should be visually inspected at the test station using an appropriate illumination in transmittance and reflectance.

The requirements for proper IGU production are the responsibility of the processor.

10 Transport and Storage of Coated Insulating Glass Units

Coated insulating glass units (IGU) are to be protected against solar radiation during transport and storage.

¹ Standard are to be fulfilled depends on regional market requirements.

11 Quality features of coated glass

The coating or other defects of heat treatable coated glass is based on European Standard EN 1096-1. The acceptance criteria for defects described in Section 7.4 of this standard are listed in Table 1.

TABLE 1: Acceptance criteria for coated glass defects

Defect types	Acceptance criteria													
	Pane to pane	Individual pane												
Uniformity/stain	Allowed as long as not visually disturbing	Allowed as long as not visually disturbing												
Punctual: Spots/Pinholes: > 3 mm >2 mm and ≤ 3 mm Clusters: Scratches: > 75 mm ≤ 75 mm	Not applicable	<table border="1"> <thead> <tr> <th>Central area</th> <th>Edge zone</th> </tr> </thead> <tbody> <tr> <td>Not allowed</td> <td>Not allowed</td> </tr> <tr> <td>Allowed if not more than 1/m²</td> <td>Allowed if not more than 1/m²</td> </tr> <tr> <td>Not allowed</td> <td>Allowed as long as not in area of through transmission</td> </tr> <tr> <td>Not allowed</td> <td>Allowed as long as they are separated by > 50 mm</td> </tr> <tr> <td>Allowed as long as local density is not visually disturbing</td> <td>Allowed as long as local density is not visually disturbing</td> </tr> </tbody> </table>	Central area	Edge zone	Not allowed	Not allowed	Allowed if not more than 1/m ²	Allowed if not more than 1/m ²	Not allowed	Allowed as long as not in area of through transmission	Not allowed	Allowed as long as they are separated by > 50 mm	Allowed as long as local density is not visually disturbing	Allowed as long as local density is not visually disturbing
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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 the site when glazed.

The pane of coated glass being examined is viewed from a minimum distance of 3 meters. The actual distance will be dependent on the defect being considered and which illumination source is being used. An artificial sky or daylight may be used as the source of illumination.

The examination of 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. During the examination the angle between the normal to the surface of the coated glass and the light beam proceeding to the eyes of the observer after reflection or transmission by the coated glass should not exceed 30°.

Architectural glass units, used in building shells and in finishing of buildings, shall be assessed for optical and visual faults as described in Hadamar ("Guidelines to Assess the Visible Quality of Glass in Buildings", issued by institute of the glazing trade for glazing technology and window manufacture, Hadamar).

12 Quality Assurance

The processor of arcon coatings has to ensure that the requirements of those guidelines are permanently fulfilled. It's glass processor's responsibility to implement a quality assurance system. Attention should be paid to visual inspection of coated glass panes.

13 Warranty

Compliance with aforesaid processing guidelines will ensure the production of high quality insulating glass units. Failure to comply with the aforesaid processing guidelines and other procedures introduced by arcon will render product warranty in-valid.

If there is a cause for complaint, arcon reserves the right to control all claims. Claims cannot be accepted, if

- The glass panes are broken due to improper storage, installation or maintenance.
- The requirements of the present guidelines are not fulfilled.

Informative glass samples need to be provided by customer in case of claims.

14 Production Aids

The following list of production aids gives recommendations for processing of coated glass into insulating glass units.

arcon emphasizes that only materials checked for their compatibility are used in IGU production. arcon cannot guarantee the quality of the recommended production aids.

Production aids from other suppliers can also be suitable.

- Gloves
 - Type: KCL-Protective cloves
 - Supplier: Kächele-Cama Latex GmbH
36124 Eichenzell
Germany

- Cutting Fluids
 - Type: CUTTING FLUID AC PE 5503, 5250
 - Supplier: Aachener Chemische Werke GmbH
52146 Würselen
Germany

 - Type: DIONOL GT 641, 644-1
 - Supplier: MKU-Chemie GmbH
63322 Rödermark
Germany

- Protection Cover
 - Type: Protection cover type MTC
 - Supplier: euroTECH Vertriebs GmbH
72351 Geislingen
Germany

- Separating agent
 - Type: AC Separol type F, G, TN
 - Supplier: Aachener Chemische Werke GmbH
52146 Würselen
Germany

- Glass Cleaner
 - Type: ACECLEAN 6147
 - Supplier: Aachener Chemische Werke GmbH
52146 Würselen
Germany
 - Type: Mixture 50 per cent by volume Isopropanol and 50 per cent by volume demineralised water
- Grinding Wheels for Edge Deletion
 - Type: FISCHLER Profilschleifscheibe Typ 3055
 - Supplier: Franz Fischler GmbH & Co. KG
86343 Königsbrunn
Germany
 - Type: ARTIFEX SK 120 HT
 - Supplier: Artifex Dr. Lohmann GmbH & Co. KG
24568 Kaltenkirchen
Germany
 - Type: NORTON RapidFinish art.no. 69957387512
 - Supplier: Saint-Gobain
Germany
- Manual Devices for Edge Deletion
 - Supplier: HEGLA
37688 Beverungen
Germany
R&R Sondermaschinen GmbH
90579 Langenzenn
Germany