

1 Introduction

These guidelines cover the requirements for processing heat treatable arcon coatings and coated fixed sizes by arcon-dur. Coated safety glass furnished under these guidelines are fully tempered glass and heat-strengthened glass. In order to achieve the desired properties, heat treatment is carried out before coating (coated fixed sizes) or after coating (heat treatable coatings).

Coated fixed sizes cover also laminated safety glass (LSG).

For convenience the terms “glass”, “glass in terms of these guidelines” or “coated glass” are used in this document.

Heat treatable coatings are marked with “HT” (“heat treatable”) and include the products

- arcon sunbelt A40 HT
- arcon sunbelt A50 HT
- arcon sunbelt A60 HT
- arcon sunbelt A70 HT
- arcon N10 HT
- arcon sunbelt D40 oHT
- arcon sunbelt D50 oHT
- arcon sunbelt D60 oHT
- arcon sunbelt D70 oHT
- arcon N34 HT

On the other hand add-on “oHT” (“optional heat treatable”) means that the product can be used either tempered or annealed.

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

The finished product is used in insulating glass units. Monolithic panes (fully tempered glass or heat-strengthened glass) can be processed to LSG in advance.

The period between delivery and processing should be as short as possible and must not exceed **5 days**. An optional LSG production inclusive of IGU production is to be done within this period of time.

This document is permanently reviewed and updated. The latest version can be downloaded on the internet at www.arcon-glas.de. Ignoring and non-compliance can result in damage to coated surface.

Furthermore regulations given in “Technical Specification for arcon Coatings” as well as requirements for uncoated glass have to be taken into consideration.

2 Package and storage

Glass products by arcon-dur in terms of these guidelines are delivered in commonly used packages. 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.

Usually the coated size is facing forwards. On request alternatives can be arranged. Please feel free to ask our sales representatives.

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

Glass products by arcon-dur are carefully packed to avoid moisture inside a glass pack during transport. Moisture can affect the coating immediately and the coated surface will become corroded. Hence the foil should remain closed until the product is used for processing. If not all glass sizes 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.

Glass products by arcon-dur in terms of these guidelines can be stored in their original package under normal conditions 5 days. Opened packaging should be processed within 1 and 2 days. However, first in first out principle should be adopted.

All deliveries 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-dur representative.

3 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 obtained from arcon.

4 Handling and processing

Before processing all plant workers have to be informed about special requirements for arcon 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 during the thermal process. Therefore, any kind of soiling must be avoided.

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 clean protective covers for them. Protective covers must be replaced regularly!

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

To avoid damages caused by scratches, glass splinters or dirt, the coated glass surface must remain towards the air side during all processing steps.

Drilling and grinding of glass in terms of these guidelines is not allowed.

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

5 Edge deletion

Edge deletion is required for glass in terms of these guidelines to ensure a functional insulating edge seal.

Safety glass by the use of heat treatable coatings are circumferentially edge deleted 10mm by default. Alternative width of edge deletion, depending on the insulating glass system which is used, is possible on request. In contrast fixed sizes are masked before coating with a special tape. This tape must be removed before IGU assembling.

Enlarging of existing edge deletion is not recommended by arcon-dur.

6 Washing process and IGU 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 $\mu\text{S}/\text{cm}$, 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 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”.

Glass in terms of these guidelines must be used as 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 solar control 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 are 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.

Ensure the best possible continuous flow of production to avoid scratches or abrasions on the coated surface if the washing process is stopped and restarted on one pane.

The processor is fully responsible for proper IGU production.

7 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:	Not applicable	Central area
Spots/Pinholes:		Edge zone
> 3 mm		Not allowed
>2 mm and ≤ 3 mm		Allowed if not more than 1/m ²
Clusters:		Not allowed
Scratches:		Allowed as long as not in area of through transmission
> 75 mm		Not allowed
≤ 75 mm		Allowed as long as they are separated by > 50 mm
		Allowed as long as local density is not visually disturbing

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.

¹ Standard depends on local market requirements.

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°.

8 Quality Assurance

The processor of glass in terms of these guidelines 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 tempered glass panes.

If you intend to use the heat treatable version and the non heat treatable version of one product jointly in one project please consult our sales department in advance. Furthermore, arcon strongly recommends the fabrication of samples and the comparison among each other. When using triple glass units with two coated panes in the glazing this aspect should be considered too.

9 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.

10 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 gloves
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