SAFETY, HANDLING, STORING AND INSTALLATION INSTRUCTIONS

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# Introduction

Attention should be paid to the issues specified in this instruction regarding the products you have purchased or will receive from our company. In this way, the deterioration of products during use is prevented, and performance features such as safety and energy saving are preserved.

Al Cam San. Ve Tic. Ltd. Şti. is not responsible for the malfunctions that may occur if the information and warnings in this instruction are not followed. This instruction should also be communicated to the installer and its employees. It should be informed that the responsibility of the deterioration that will occur in the event of not complying with this information and warnings belongs to the installation company performing the application.

Al Cam San. ve Tic. Ltd. Sti. can control the stock and transportation conditions of the products.

# Product Specifications and determining the configuration

## General information

Glasses that will be exposed to a heat source may experience thermal breakage, especially if they are not tempered. This is due to the nature of the material and is not a defect. The glass must be ordered and produced with a thermal resistance suitable for the intended use.

Necessary dimensional tolerances should be considered when determining glass dimensions.

For the glass slot width on the frame, the thickness tolerances of the insulating glass units must be considered.

## Laminated glasses

The glasses that make up the laminated glass (drilled, cnc carved, etc.) can be tempered or heat strengthened for static reasons. However, in glass balustrades and similar applications, tempered laminated glass is not suitable for use as it empties the system by creating a fabric effect when both panes are broken. In such applications, the use of partially tempered laminated glass, extra-strong or SentryGlas Xtra interlayer material is recommended.

## Tempered glass

For all tempered or heat strengthened glass orders the tempering direction (layout on the rolls) can be determined by drawing. If not specified, production is carried out as Al Cam’s production team considers appropriate.

Tempered glasses can break spontaneously due to NiS particles. To reduce this possibility, a heat soak test (HST) can be applied. This test must be requested by the customer at the quotation stage.

Unless otherwise stated by the customer at the offer stage, all tempered and heat strengthened glasses are marked (logo) in accordance with the building materials regulations and Al Cam procedures.

## Insulating Glass Units

Alcam’s written confirmation is required for the applications of insulating glass other than conventional window products (parapet, overhead and structural glazing) and their use at glass surface temperatures lower than -30°C and higher than +80°C.

Silicon is required as the secondary sealant where the insulating materials on the edges of the insulating glass units may be exposed to direct sunlight. Usage area and configuration of insulating glasses must be specified by the customer. If not specified, insulating glass is considered Type A (EN 1279-1:2018) and the combination desired by the customer is produced.

In insulating glass orders, the customer must specify the altitude to which the application will be made and the highest altitude to which the glasses will be transported during the ordering phase. According to this information, our company can apply pressure balance to insulating glasses.

Insulating glass units with spacers (U profile, economic lath, etc.) other than aluminum and warm edge spacer used in the insulating glass unit are not covered by the warranty.

Edge deletion is applied to some coated glasses used in insulating glass units. Color difference and linear traces may occur after the edge deletion process.

## Painted Glass

Enameled glasses are produced to cover the light-tight spandrel areas with their back side closed, unless otherwise specified. If the back side of the glass is open and receives daylight, it must be specified before the order or offer.

## Facade IGU (structural glazing - bonding)

The customer should specify the details of the Project and the IGU (design, glass thicknesses, sealant depth, glass type, processes applied to the glass, glass dimensions, expected load exposure, edge work details, etc.) according to the intended use and EN 13022-1 and EN 13022-2.

Primer solution application is required for painted surfaces, in order to use this solution, the paint type on the frame must be known. The customer must indicate the type of paint and its compatibility with the silicone.

# Inspecting the glass

The control of the purchased products should be done at the time of delivery. Responsibility for defects (external scratches and stains, breaks, burrs and flakes etc.) to be detected after delivery belongs to the customer.

The inspection method shall be the same as described in EN 1279 Standard. The acceptance criteria for the dimensional and visual defects shall be as described in EN 1279 Standard.

Seen in insulating glass units; spectra (Interference Coloring, Brewster Ring), double glazing effect, coloration (Leopard spots) and optical fluctuation (roller traces) in insulating glass units produced with tempered glasses, fluctuations in images caused by temperature and barometric pressure changes, condensation on external surface of the unit caused by atmospheric conditions is normal and is not considered an error.

In heat treated glasses, air traces (anisotropy) occur on the tempered glass due to the internal stress distribution in the glass. It is not possible to prevent dark circles seen in polarized light and detected depending on the viewing angle.

"Temperature traces" and "general bow" that can be noticed under certain light conditions, are the inevitable and unavoidable results of heat treatment.

Color tone and brightness differences may occur in painted glasses. This is not a manufacturing defect, but a paint firing process result during tempering. If the tonal differences remain within the limits specified in the European standards, it is not considered a defect.

# Handling, Storing and Installation

If the products are damaged during transportation on construction site, storage or assembly, this damage may cause other problems such as breakage and condensation later.

Making repairs on the IGU’s in the construction site should not be applied.

Suction cups and gloves used while moving and assembling the glass must be clean and suitable for contacting the glass. Otherwise, permanent stains may occur.

It should be ensured that the glasses are not exposed to load during storage and transportation.

Products should not be stored outdoors. They should not come into contact with snow, rain, mud and water. These conditions can lead to permanent stains and other problems.

For ideal storage, temperatures between 9-25˚ C and humidity below 70% are recommended. Wet glass in stock has a high risk of corrosion. For this reason, it is recommended to clean the windows before they dry if they become wet or condensed in any way.

Stacking of glasses should not be done directly on concrete or earth ground, in wet and damp places.

Care should be taken not to damage the glass by other operations (eg plaster, paint, welding, etc.) after the assembly is completed.

## Additional warnings for Satinated Glass

The satinated (acid etched) face of the glass should not be Face #1 (outside of the building). If satin glass is used in an application such as shower cabin glass, it is recommended to install it so that the satin side does not touch the water, because the opacity decreases when the satin surface meets water. All insulation and assembly materials such as sealants, adhesives, etc. should be inspected before being applied to the satin coated surface. Such materials can change the appearance of the glass.

## Additional warnings for Laminated Glass

In asymmetrical laminated glasses, the mounting direction must be in the direction that is based on the performance values. (low-e coated, reflective, self-cleaning coated, anti-reflective coated, etc.)

In order to meet the declared performance values, the assembly direction must be as instructed on the label for bullet-proof and explosion-proof products,

If there is a protective film on the bulletproof glasses, it should be removed immediately after assembly.

It is the responsibility of the implementing company to ensure the sealing with silicone and similar materials compatible with the pvb or other interlayers used in the production of laminated glass.

## Additional warnings for Insulating Glass Units

Installation of insulating glass should be done in accordance with the rules and recommendations in EN 1279-5 and EN 13022.

Insulating glass units should not be stored or transported in direct sunlight. Each heated glass may compress the other due to swelling and cause scratches and breakage. The outer sealing material may deteriorate under the influence of sunlight. In addition, there is a risk of thermal breakage since the colored or reflective glasses stored under the sun cannot be adequately ventilated. If polyurethane is used as the secondary sealant of the insulating glass, these insulating glasses should never be kept outdoors (under the sun). Such improper storage causes the PU sealant to deteriorate and separate easily from the glass.

Insulating glasses should be stocked on pallets placed in vertical position (at an angle of approximately 10 degrees) on their long sides and sitting upright (90 degrees) on the pallet base. Direct contact of the glasses with each other should be prevented by using a separator (for example, cork wedge) between all stacked insulating glasses. The back of the products should be leaning against the pallet, point loading and touching the bottom of the single glass of the insulating glass unit should be avoided. Fractures may occur because of swelling and force loading that may occur due to pressure changes. When stacking insulating glasses of different sizes, small-sized glasses should come in front of large-sized glasses, and compression from the core should be prevented. Longitudinal laths should be placed between the two glasses to prevent pressing from the hub, and the distance between the laths should not exceed 50 cm.

The secondary sealing material should never be damaged.

The application details for pressure equalizing are notified to the buyer. The buyer company is responsible for proper application. The balancing holes should be closed before assembly of the IGU. Improper sealing of the pressure balancing holes may cause insulation problems.

Frame profiles must have the strength to transfer the design loads from the glass to the structure safely and not to allow the glass deflections to exceed the permissible limits.

The cork wedges on the glass units should not be used as mounting wedges.

Insulating Glass Units should be avoided to contact with water in the frames. Necessary drainage system or holes should be present on the frames. To protect the outer sealant material, contact of metal screws should be avoided during assembly.

The edges of the insulating glass units must be protected from the effects of sun rays (UV) by completely covering with materials suc as cover, epdm, silicone, etc. Special silicone sealing should definitely be requested at the joints that are open to UV rays (structural glazing).

The materials to be used in the assembly of insulating glass products (structural silicones, sealing silicones, joint sealants, adhesives, etc.) must be compatible materials that do not contain acidic solvents.

The assembly sealants and adhesives (structural silicones, sealing silicones, joint sealants, adhesives, etc.) may contact primary (butyl) and secondary sealants (Polyurethane, polysulphate, silicone) of the Insulating Glass Units. These materials can enter a chemical reaction and cause chemical, visual and structural deterioration in the insulating glass units. Compatibility tests of these materials with primary and secondary insulation materials used in the production of insulating glass are required. It is the responsibility of the assembly company performing the said compatibility tests.

Frequently faced assembly mistakes are: Uneven frames, squareness of the frames, wrong wedge application, insufficient drainage system on the frames, tight or loose fitting of the glasses into the frames due to wrong dimensions, repairing the units on construction site.

## Additional warnings for Painted Glasses

The assembly rules and recommendations specified in EN 16477-1 must be followed.

When light colors are preferred for the enamel-painted glass, ghosting may occur due to mounting by silicone or other materials.

Painted glasses should not be used outdoors, in aggressive or high humidity environments (eg swimming pools, saunas). In such environments, color tone changes may occur because of high humidity on the paint over a long period of time. Bathrooms and kitchens are not considered as aggressive or high humidity environments.

The appearance of the colors may vary depending on the permeability of the paint, the background color, the light and the assembly conditions.

Assembly materials should not be hard enough to damage the paint coating. Materials contacting the glass must be clean and dry, free of acidic or aggressive agents and the chemicals used (including cleaning liquids) must be compatible with the paint. Selection and application of compatible materials is the responsibility of the installer.

It should be noted that when painted glasses are exposed to heat sources that can create a high temperature difference, such as spotlights, this can lead to paint deterioration and glass breakage.

If the glasses are to be mounted on the same surface, there must be a gap between the edges that will form the boundaries (close to touching each other). A suitable 1mm spacer can be used during assembly.

All adhesives, double-sided tapes and similar materials used for assembly should be used vertically.

## Additional warnings for mirrors

The assembly rules and recommendations specified in EN 16477-1 must be followed.

The reflective silver layer and protective coatings of the mirrors are susceptible to deterioration and corrosion. This usually depends on the environment and mounting materials.

Mirrors should not be used outdoors, in aggressive or high humidity environments (e.g. swimming pools, saunas).

If the mirrors are to be mounted on the same surface, there must be a gap between the edges that will form the boundaries (close to touching each other). A suitable 1mm spacer can be used during assembly.

Assembly materials should not be hard enough to damage the coating of the mirrors. Materials contacting the mirrors backside must be clean and dry, free of acidic or aggressive agents and the chemicals used (including cleaning liquids) must be compatible with the protective paint. Selection and application of compatible materials is the responsibility of the installer.

All adhesives, double-sided tapes and similar materials used for assembly should be used vertically.

Mirrors should be mounted flat and free from tension to obtain the reflectivity and image performance expected from the mirror. Bearing the weight of the glass only on the edges can cause bow and image distortions. When the mirror is mounted with tape, care should be taken not to deteriorate with pressure. If possible, the mirror should not be attached to the surface, but the surface should be adhered to the mirror and the mirror should be mounted flat.

Mirrors should be mounted securely but not subject to stress. The roughness and unevenness of the walls should be balanced with a suitable soft material.

## Additional warnings for facade glazing

The assembly should be done in accordance with the rules and recommendations in TS EN 13022-1.

# Use and Cleaning

After the insulating glass unit is mounted, the stickers on the surface of the glasses should be removed so as not to leave any traces.

After the insulating glass unit is installed, the final consumer should be informed about the use and cleaning of the glasses. The use of abrasive materials such as knives, hard-surfaced sponges, razors, metals, chemicals while cleaning the glass units should not be used as they may cause permanent scratches on the glass surface. In case of contact with a hard object or hot material (welding spatter, etc.) on the glass surface during or after insulating glass installation, irreparable damage to the glasses may be caused.

Negative results of applications such as dark curtains, roller blinds, labels, which may cause heating and cooling of the windows, should be shared with the final consumer. Such applications may cause thermal glass breakage, which may cause expansion due to regional heating in the glasses.

While cleaning the glasses, abrasives, aggressive chemicals and acidic materials should not be used. Metal materials such as wire and knives should not be used to remove stains. They can leave permanent marks that can be visible in certain light conditions. Standard glass cleaners can be used.

# Ürün standartları

Unless otherwise stated in the contract, our products are manufactured and can be tested in accordance with the following Turkish and European norms.

TS EN 572-1: Basic soda lime silicate glass products – Part 1:
TS EN 572-2: Basic soda lime silicate glass products – Part 2:Float glass
TS EN 572-3: Basic soda lime silicate glass products – Part 3:Polished wired glass
TS EN 572-4: Basic soda lime silicate glass products – Part 4:Drawn sheet glass
TS EN 572-5: Basic soda lime silicate glass products – Part 5:Patterned glass
TS EN 572-6: Basic soda lime silicate glass products – Part 6:Wired patterned glass
TS EN 572-7: Basic soda lime silicate glass products – Part 7:Wired or unwired channel shaped glass
TS EN 572-8: Basic soda lime silicate glass products – Part 8:Supplied and final cut sizes
TS EN 1096-1: Coated glass – Part 1: Definitions and classification
TS EN 1279-1: Insulating glass units - Part 1: Generalities, system description, rules for substitution, tolerances and visual quality
TS EN 1279-2: Insulating glass units - Part 2: Long term test method and requirements for moisture penetration
TS EN 1279-3: Insulating glass units - Part 3: Long term test method and requirements for gas leakage rate and for gas concentration tolerances
TS EN 1279-4: Insulating glass units - Part 4: Methods of test for the physical attributes of edge seal components and inserts
TS EN 1279-5: Insulating glass units - Part 5: Product standard
TS EN 1279-6: Insulating glass units - Part 6 Factory production control and periodic tests
TS EN 13022-1: Glass products for structural sealant glazing systems for supported and unsupported monolithic and multiple glazing
TS EN 13022-2: Structural sealant glazing - Part 2: Assembly rules
ISO 11485-1: Curved glass – Part 1: Terminology and definitions
ISO 11485-2: Curved glass – Part 2: Quality requirements
ISO 11485-3: Curved glass – Part 3: Requirements for curved tempered and curved laminated safety glass
TS EN 12150-1: Thermally toughened soda lime silicate safety glass - Part 1: Definition and description
TS EN 12150-2: Thermally toughened soda lime silicate safety glass - Part 2: Evaluation of conformity/Product standard
TS EN 1863-1: Heat strengthened soda lime silicate glass – Part 1: Definition and description
TS EN 1863-2: Heat strengthened soda lime silicate glass – Part 2: Evaluation of conformity/Product standard
TS EN 14179-1: Heat soaked thermally toughend soda lime silicate safety glass – Part 1: Definition and description
TS EN 14179-2: Heat soaked thermally toughend soda lime silicate safety glass – Part 2 Evaluation of conformity/Product standard
TS EN ISO 12543-1: Laminated glass and laminated safety glass - Part 1: Definitions and description of component parts
TS EN ISO 12543-2: Laminated glass and laminated safety glass - Part 2:Laminated Safety Glass
TS EN ISO 12543-3: Laminated glass and laminated safety glass - Part 3: Laminated glass
TS EN ISO 12543-4: Laminated glass and laminated safety glass - Part 4: Test methods for durability
TS EN ISO 12543-5: Laminated glass and laminated safety glass - Part 5: Dimensions and edge finishing TS EN ISO 12543-6: Laminated glass and laminated safety glass - Part 6: Appearance
TS EN 14449: Laminated glass and laminated safety glass - Evaluation of conformity/Product standard TS EN 356: Security glazing- Testing and classification resistance against manual attack
TS EN 16477-1: Painted glass for internal use – Part 1: Requirements
TS EN 1036-1: Mirrors from silver - Coated float glass for internal use - Part 1: Definitions, requirements and test methods
TS ISO 614: Shıpbuldıng and marıne structures - Toughened safety glass panes
TS EN 1063: Security glazing - Testing and classification of resistance against bullet attack
TS EN 12600: Pendulum test - Impact test method and classification for flat glass

Alcam provides products according to the specifications and configurations specified in writing by the customer. It is the customer's responsibility to ensure that the product and its features and configurations comply with the usage area and legal requirements.