



#passionforglass

HANDBOOK GLASS HANDLING

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1. Objective

This manual has been issued with the aim of describing the different methods of packing and crating currently available at Tvitec to assure the appropriate shipping, transport and reception of all the products fabricated and sent out from our facility, whatever their specific features are.

Therefore, the main targets are:

1. To keep the personnel safe during all times.
2. To protect the goods during transportation.
3. To optimize the transportation system.
4. To improve the reception and handling of the load by customers.

2. Requirements

A proper packing/crating and shipping of the finished goods requires following the guidelines stated on this manual.

The equipment and procedures outlined may be updated at any time by Tvitec personnel due to the unique nature of each project in addition to our improvements on a continual basis. Any variation on the shipping system will automatically update this manual so that the whole organization is informed about the latest changes.

Every extraordinary request from TVITEC'S customers that is not in accordance with these guidelines will be analysed and valued by the shipping area before accepting a purchase glass order.

Front view and lateral view of a rack



3. Packing and crating

TVITEC currently offers two types of packing systems for glass: glass transport racks and metal cages.

The type of packing used will depend on the features of the goods to be shipped out, method of transportation, the customer's requirements and/or the standards to be met.

3.1 METAL RACKS

The metal racks are a tool used to store and transport glass units and it is primarily composed of steel, in addition to wood or rubber glass support pieces used to avoid damage to the units.

All the racks used by Tvitec are identified with the following sticker/label.

All racks are certified and approved to support a maximum load of 3200 Kg. However, this maximum load may be limited or reduced in accordance with the project specification which must be communicated to TVITEC prior to order placement.

The racks have been designed to be lifted and transported with forklifts, slings and cranes.

In general, all glass panes are strapped and secured as a whole package, and may then be partially covered by a transparent film. The upper part of the package would remain open due to its installation method. It is then possible to cover the upper portion on the units with a with plastic sheet.

If the customer does not wish to use a plastic covering, the units can be strapped directly to the rack or strapped together in bundles. This takes place at the end of the fabrication process.

Likewise, depending on the size of the rack and glass units, "wooden brakes" can be used. A wooden brake is a block placed and secured on one of the sides of the rack, specifically on the side facing the truck cab. The reason for this brake is to minimize the consequences of possible issues during transportation or unloading.

In cases where the glass units are larger than the rack, cardboard edge protectors may be used.

Meaning of the code:

- 16.- Year of fabrication
- 011.- Rack type
- 00000.- Rack serial number



Packaging with plastic sheets



Units strapped together in bundles (left) and units strapped to the rack individually (right)

Packing list

Planificaciones: 7850

CLIENT CORPORATION

Caballette

1902401287



Pedido	Posición	Cantidad	Peso	Dimensiones	Ref. Posición	Artículo
4008890	8	8	522,4 Kg	1173 W X 1857 H	S/O PROJECT	3+3.1 INCOLORO//INT14//3+3.1INCOLORO
4008890	8	8	522,4 Kg	1173 W X 1857 H	S/O PROJECT	3+3.1 INCOLORO//INT14//3+3.1INCOLORO
4008890	8	8	522,4 Kg	1173 W X 1857 H	S/O PROJECT	3+3.1 INCOLORO//INT14//3+3.1INCOLORO
4008890	8	8	522,4 Kg	1173 W X 1857 H	S/O PROJECT	3+3.1 INCOLORO//INT14//3+3.1INCOLORO
4008890	8	8	522,4 Kg	1173 W X 1857 H	S/O PROJECT	3+3.1 INCOLORO//INT14//3+3.1INCOLORO
TOTALES		24	1527,2 Kg			

THE FINAL POSSESSOR OF WASTE OF PACKAGING AND USER PACKAGING, ACCORDING TO WHAT IS ESTABLISHED IN LAW 11/1997, MUST BE DELIVERED IN ADEQUATE CONDITIONS OF SEPARATION FOR MATERIALS TO AN ECONOMIC AGENTE FOR REUSE, TO A RECOVERY, TO A RECYCLER OR AN AUTHORIZED VALORIZER.

Every rack shipped from Tvitec has a packing list containing the information of the glass loaded. This packing list is placed inside a protective plastic bag and fixed on the external face of the rack.

The following information can be found in each packing list: the order number, glass position, number of units

per position, glass sizes, glass weight, glass make-ups and the reference number for each rack.

The following table shows all the current certified racks at our disposal. Additionally, TVITEC offers customized solutions in accordance with specific project requirements.



Ref.	002	004	006	009	010	011
Model	30-27-8-1	30-29-8-1	24-15-8-3	20-20-8-1	12-20-8-1	12-21-10-1
Serial N°	1600200000	1600400000	1600600000	1600900000	1601000000	1601100000 standard
Length (mm)	3060	3020	2420	2025	1285	1200
Height (mm)	2710	2960	1560	2015	2025	2175
Width (mm)	800	800	800	800	800	1060
Self Weight (Kg)	113	113	68	65	55	102
Máx. Load. (Kg)	3200	3200	3200	3200	3200	3200
Length support (mm)	215	200	285	255	255	390

3.2 METAL CRATES

This packaging system is available for small glass units, and has traditionally been used for residential projects.

These crates allow a maximum weight of 2.500 Kg (including self-weight) and can be placed on top of each other (limited to two levels), optimizing transportation

space. These metal crates have side openings for ease of handling.

They are designed to be handled and lifted from the bottom with forklifts.

In addition, a packing list is attached to each metal crate with the same information described above.

Metal crates (left)
Metal crates ready
for shipment (right)





Exterior storage zone with some racks (left)

4. Storage

During the recent expansion of TVITEC's main plant, a new exterior storage location has been built to store racks goods until shipment. This storage area is covered, well ventilated, protected from direct sunlight and atmospheric elements, and maintained clean. This allows the glass to be kept safe in good condition before shipment.

Specific zones have been created for large volume customers and or projects for a more organized inventory. In addition, the new exterior storage location will expedite and optimize the loading of glass onto trucks.

5. Methods of transportation

As a result of TVITEC'S global customer base, the transport of glass from Tvitec is conducted via ground air or sea transport to the customer's destination of choice.

For domestic and near European destinations the goods are shipped on trucks or lorries.

Domestic and close proximity European destinations, goods are shipped on trucks or lorries. Further destinations from TVITEC, require shipment by sea freight either on boat or vessel. Air freight is available to reduce shipping time, but at an increased cost.



Wooden crates being loaded on an airplane (left)

Wooden crate for air freight (right)



5.1 GROUND TRANSPORTATION

Glass finished products are shipped on trucks or lorries for domestic and near European destinations. Loads are limited to a maximum weight of 24 metric tons.

Racks are loaded by following a standard procedure based on the weight and volume of the goods.

Likewise, racks are secured on the truck to avoid any movement of the goods during transportation.

5.2 AIR FREIGHT

Air freight, due to its high cost, is usually advisable for exceptional intercontinental shipments that require a short shipping time or are exceptionally urgent.

Glass goods are completely crated with treated and certified wood, keeping the glass integrity against possible improper handling during loading or throughout the flight. All crates have their packing list stuck to them.

5.3 SEA FREIGHT

Racks are loaded on metallic containers. These containers are loaded at TVITEC's premises and brought them to the sea port on trucks. Once they arrive at the sea port, containers are loaded onto boats or vessels.

There are 2 types of containers: closed or open top.

Depending on the requirements of the destination sea port, the type of container to use may vary. The maximum allowable weight usually is about 20.000 Kg but, depending on the height of the load in closed containers, the weight may also vary. It must fit in the space the container doors allow. On open top containers the load weight is limited by the destination sea port, usually due to height limits with the gauge on roads or at the sea port itself.



Stowage at sea port (left)
Vessel (right)

5.3.1 Loading of closed containers

Once the content of the container has been planned and confirmed and there is a time scheduled for loading, all the racks are getting ready on the storage area close to the loading dock to make the loading process easier and quicker.

TVITEC'S QC/QA department revises the finished products to check if they are in accordance with the agreed quality criteria and the loading procedures. To do that the personnel from the shipping department will let the QC/QA department know in advance with enough time.

The truck will park at the loading dock and will activate the braking security system in order to avoid any movement or shifting during loading. Right after, the footbridge that gives direct access to the container will be released.

Immediately after, the loading process will be started. The racks will be put into the container by forklifts. The

driving of the forklift will be handled free-flowing and safe, avoiding sudden movements that may affect the stability and integrity of the load.

The racks will be then put into the container so that any uncontrolled movement of the racks may occur. The positioning of the racks will not happen randomly but based on a detailed study made by the shipping department in accordance with optimization and safety criteria.

At the same time, the load is being secured by wooden brakes and crossbars. Securing the load is essential to avoid breakages during transportation.

Once the loading has been completed, the truck will bring the container to the sea port where the stevedores will load it onto the vessel. Right after arriving at the destination sea port the container will be again loaded on a truck and brought to the final destination.

Closed containers placed at the loading dock (left)
Forklift (right)



Placement of the racks inside the container (left)
Fully loaded and secured container (right)



5.3.2 Loading of open top containers

Open top containers do not have any cover on the upper part which allows the loading of glass panes higher than the container itself. The upper part will be then covered by a plastic sailcloth.

Once the glass panes have been properly packaged for this kind of transport, they will be stored on the designated areas and will wait to be shipped out. The shipping department will study the load distribution in the container based on optimization and safety criteria.

Right after placing the container on the designated area, the loading process starts. The racks will be lifted individually and safely by slings with a crane.

The racks are then put into the container by following a certain sequence: from the container side wall to the interior part of the container.

Once the racks have been loaded into the container an individual strapping of each rack to the metallic wall of the container must be done. To finally secure the whole load, wooden brakes and crossbars will be placed to avoid any shifting or movement of the load during transportation. Finally, the open top part of the container will be covered by a plastic sailcloth.



Racks lifted (left)
Loading container (center)
Loading from outside to inside (right)



Strapping and full load reinforcement (left)
Open top containers (right)

6. Uploading

Right after the arrival of the container at the destination, the unloading of the container must take place. For the proper handling of the racks and in order to avoid any breakage it is mandatory to follow these uploading procedures.

Initially all wooden brakes and crossbars must be removed.

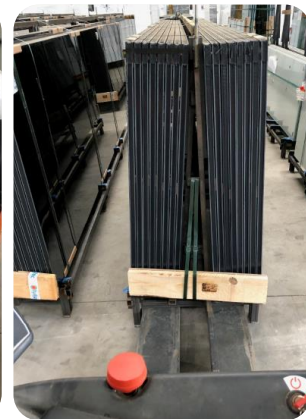
In case of closed containers and once the racks have been released, the racks can be taken out by forklifts, making sure that the racks are completely lifted up and keeping a continuous and stable support during the

whole process. This will avoid any shifting, displacement or movement of the racks and the glass inside.

In case of open top containers, the racks will need to be lifted by slings and cranes through the upper opening.

The customer must report in the moment of the reception of the goods any issue related to transport. This issue will be noted in the delivery note.

TVITEC will not be responsible of any issue due to improper handling by the customer during the unloading process.



Wooden brakes and crossbars (left)
Forklift (center)
Lifting of a rack by forklift (right)

7. Uploading procedure



8. How to store glass

Once the customer has received the glass, and waiting for its future installation, storage period elapses, which is a particularly sensitive period in which the final product quality can be compromised.

It must be noted, that several factors, such as physical abrasion, direct contact with water, condensation or high temperatures can affect the behaviour of glass, causing breakages, defects appearance or glass decline.

Proper storage always should be carried out under the following guidelines:

Generally, all glass must be stored in an indoor ventilated area, dry and clean, protected from the inclement weather and the direct action of the sunlight, and away from any kind of splash, such as cement, grinding or welding among others.

Glass should not be exposed to sudden changes; it is advisable to maintain a constant temperature.

To minimize the possibility of condensation on the glass, it is recommended to storage glass with a temperature higher than the dew point temperature.

Glass should always be placed in vertical position, with an approximate slope of 6°.

Glass should be stored on a flat and tough surface, away from the crossing zone, properly demarcated and signposted, with enough space between stillages to make easier their future movement.

The lower support must be sloped to maintain 90 ° in relation to the vertical one. Both supports will be always protected by a soft material.

Maximum thickness of glass stacking should not exceed 50 cm.

Glass must be separated from each other by interlayers in a way that ventilation between them is allowed.

Outside glass storage:

In case of being essential to store glass outside, which is a situation that must be avoided as far as possible, the following recommendations should be added to the previous instructions:

It is essential to cover glass under a ventilated awning.

Glass should be protected from direct action of sunlight, glass storage in areas exposed to its action is especially dangerous, due to the heat absorption can cause thermal breakages, mainly in insulating glass, coloured glass and reinforced glass.

Glass should be protected from rain, wind, frost and weather in general; preventing the accumulation of water between glasses.

Glass should be away from areas with possible projection of dust, dirt or other particles that may directly or indirectly affect the glass, such as chemical reaction on the glass surface, or due to a subsequent cleaning process which is not done correctly.

Glass should be away from areas with vehicle movement and work areas in general.

A regular observation routine of the pieces is recommended during the period covered from the glass receipt to its placement in work. In the same way, it is necessary to check every day the condition of each stillages.

Any glass, which shows signs of fogging or superficial defects, must be separated, cleaned and dried immediately.

9. Glass cleaning procedure

In order to remove from glass surfaces the dirty settled because of the exposition to environmental conditions and to the normal use, it's necessary to take into consideration some precautions.

A. General glass cleaning

Use a clean cloth soaked in water.

Always use appropriate glass cleaning products and follow the manufacturer's instructions. Dry the glass immediately after cleaning with a clean and soft cloth.

A 50% alcohol/water mix or a 50% ammonia/water mix would also be options. Concerning the cleaning Agent, take care to rinse it off immediately with clean water, and dry the glass as well as the window frame and any hardware with a clean soft cloth or a cellulose sponge.

The use of highly acid and alkaline products is forbidden, as well all the abrasive products

Clean small areas at a time and inspect the surface frequently for any sign of damage.

For best results glass surfaces should be cleaned when shaded and not in direct sunlight.

Cleaning must be start on top of the building going down to the lower levels to reduce the risk of leaving waste of cleaning solutions at lower levels.

B. Precautions

Do not use abrasive cleaning solutions or materials. Do not use petroleum-based products.

Hydrofluoric acid and phosphoric acid are corrosive for glass surfaces and they must never use.

Protect all glass surfaces from possible acid splatter and glass cleaning products used in the cleaning of aluminium, concrete, and bricks. Glass should also be protected from splatters produced during the welding process.

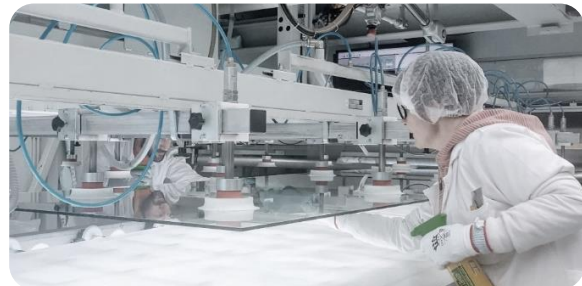
Avoid glass cleaning products and solutions coming into contact with the laminated edges of the double-glazing units.

Do not use metal scrapers, blades or steel wool on glass surfaces.

For surfaces with frit or coatings (anti-scratch, self-cleaning, anti-reflective or similar) particular precaution must be used, particularly not use scrapers, abrasive detergent and follow specific instruction to be asked and agreed together with the order.

Avoid that water, detergent and any cleaning material stay in contact with sealant and glass edges for long time (no more than 10 minutes).

Cleaning at "Clean room" (top)
Cleaning façades (bottom)



Glass from another dimension

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Claim issues Related to transportation



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***Our leadership is
based on excellence,
innovation and the
most avant-garde
techniques.***

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glass from another dimension

Trucks



First step

The customer must inform TVITEC of any possible damage within a period of 24 hours after the truck has been delivered, **NO LATER**. For that reason, it is very important that the receiver checks the goods in a very short of period after the offloading

Documents

Delivery documents signed/stamped including any type of damage. It is **IMPERATIVE** all the incidences are noted on the **CMR/DELIVERY NOTE OR PACKING LIST** in order to submit any claim.

In the case that the rack has any external damages, such as cracks, dents, holes, etc. The customer must note them on the delivery documents (if any), since it is best way to justify that the damage has been caused by the transport company.

Pictures

The receiver shall take pictures of the goods inside the truck/rack once opened to check if there is any broken unit before the offloading, as well as of the unloading process.

Getting evidence of the damages is mandatory in order to submit the claim, please take pictures.

Insurance

If the claim is over 1.500 €, the insurance company will send a surveyor to inspect the damages. The damaged units must be stocked separately to be checked.

Containers



First step

The receiver must inform TVITEC of any possible damage within a period of 24 hours after the container has been delivered, **NO LATER**.

Documents

Delivery documents signed/stamped including any type of damage. It is **IMPERATIVE** all the incidences are noted in order to submit any claim.

If the receiver notices a possible incidence during the unloading process, he must write "pending to be revised to evaluate any possible damage" and notify the issue within the next 24 hours.

Please, check if the container has any external damages, such as cracks, dents, holes, etc. The receiver must note them on the delivery documents (if any), since it is best way to justify that the damage has been caused by the shipping company.

Pictures

The receiver shall take pictures with the goods inside the container once opened to check if there is any broken unit before the offloading, as well as of the unloading process.

Getting evidence of the damages is mandatory in order to submit the claim, please take pictures.

Insurance

Once the claim submitted, the insurance company will send a surveyor to inspect the damages. The damaged units must be stocked separately to be checked.

In order the claim to be accepted, the customer must issue a **CERTIFICATE OF DESTRUCTION**.