1. INTRODUCTION

On occasion, due to lack of refrigeration space, products such as, potatoes, onions, garlic, and citrus fruit are carried in well-ventilated general cargo spaces or in containers for short voyages.

The mere fact that the products and procedures were passed by PPECB does not imply that the product will not lose quality during subsequent storage and transport, and are generally not recommended.

2. GENERAL CONDITION

Product requirements change during the season, also climatic conditions, may require that some products cannot always be shipped ventilated.

Products that may be shipped under these conditions are early season citrus, onions, potatoes, most of the pumpkin varieties, oiled eggs and dried fish.

Certain mixes may be possible, while other such as onions or fish will create severe cross tainting.

Ambient air is passively (convection) or actively (fans) circulated through the load during the voyage. Special equipment and procedures are required and this shipping method can be used to certain countries only. **The PPECB will evaluate each shipment in consultation with the exporter prior to approval of this system.** Special procedures are required of which the following are the most important:

- By accepting a booking the shipping line approves the stowage of ventilated containers with onions and must therefore adhere to the special PPECB carrying instructions.
- The onions must be packed in woven (knitted) bags on pallets and must be at the time of loading into or onto the shipping equipment.
- PPECB prescribed procedures for handling, loading, transport and preshipment storage must be adhered to. Exporters must consult with the PPECB prior to loading in order to finalise the most optimum procedure for the particular type of equipment to be used.

The basic requirement is to allow for maximum fresh air circulation throughout the total load to maintain the product temperature in equilibrium with the ambient. Horizontal and vertical air plenums (chimneys) must be provided to assist in convection of air. In this way hot spots are prevented and condensation cannot form.

The best practical method is to position pallets vertically against the bulkhead of the container and to load onto pallets on the floor. Ideally a horizontal layer of pallets should also be used more or less in the middle (centre line) of the container (this does not apply to ventainers). A minimum opening of 150mm must be left between the top of the load and the roof of the container, to allow for the air to escape at the top.

The ISO pallets however, do not fit snugly into a general purpose (GP) container, leaving openings that may damage break bulk loaded cargo. These openings can be covered by suitable sized wooden blocks. An alternative, however, is to use wooden dunnaging (forward/aft) on the floor and possibly in the middle of the load for break bulk loading. Costs may however, be a major consideration.

- Only PPECB approved shipping equipment (flat racks, ventainers, open-door containers etc.) may be used. **These units must be stowed on deck.** Under deck loading is only possible if such decks are fitted with high volume extraction fans.
- The PPECB will formulate a carrying and special procedure that must be executed by the Master / Chief Engineer.

The PPECB will issue written instructions to the Master and Chief Engineer, to ensure that the onions are protected from the elements and kept dry during the voyage.
Maximum fresh air ventilation will be applied during the voyage to reduce possibility of condensation. Care must however be taken not to introduce too cold or too warm air in order to maintain a fairly stable product temperature. Special care must be taken not to introduce air at sub zero temperatures.

The Master/Chief Engineer must keep accurate records of voyage conditions and other aspects such as opening and closing of tarpaulins (flat racks and open door containers) and operation of fans (ventainers).

After the voyage it is the responsibility of the exporter or his agent to ensure that:

- The importer is informed of the shipment before discharge in the overseas port.
- The importer to arrange for immediate post discharge transport, storage and correct handling to avoid exposure of the onions to adverse ambient conditions, temperature fluctuations, condensation and other factors that may result in quality and other losses.
- Active fresh dry air ventilation must be applied for as long as the onion pulp temperatures are below dew point (wet bulb temperature).

3. DIFFERENT VENTILATED SHIPMENTS

3.1 Breakbulk – Conventional

Change air vents or fresh air ventilators must be fully open for the entire duration of the voyage. Continuous ventilation in the deck must be carried out by means of fans for as long as the temperature intake air (ambient) is equal to, or less than the temperature of the exhaust air.

When the inlet air temperature rises to a point, which is higher than the exhaust air temperature, continuous ventilation must be stopped. While this condition prevails, the fans must be run for approximately one hour during the coolest time of the day, irrespective of temperature.

When outside condition change to provide a cooling effect in the cargo space once more, the fans must again be run continuously.

If the intake air temperature drops below 4.5°C (40°F), all ventilation must be stopped.

A daily record must be kept of the air intake temperatures and exhaust air temperatures.

Ventilated cargo must never by stowed close to heat sources such as on top of heated tanks or adjacent to the engine room. The Cargo Officer is responsible to ensure that the cargo will not be exposed to unnecessary sources of heat.

Cargo must be protected against the direct rays of the sun and rain at all times.

In addition to above temperature, the following must be recorded:

- Times of fan operation
- CO₂ measurement taken
- Times tarpaulins were rolled up/down where flat racks are stowed on deck
- Report on any breakdown in the stoppage of ventilation
- Report where there has been a failure to carry the cargo at the condition specified in the carrying temperature letter given to the Captain prior to departure.

The temperature recording log and other records specified, or copies thereof, must be forwarded to the PPECB port office, where final loading was done or to the PPCB Head Office.
4. CONTAINERS

4.1 Introduction

The PPECB does not recommend the concept of open door or open sides container shipment, because shipping conditions cannot be controlled or even manipulated to obtain optimum product requirements.

Open door and open sides container shipments of certain products to certain destinations are however allowed, because this is often the only system available.

Exporters can also not hold the PPECB or the Shipping Lines responsible for quality loss directly or indirectly related to the open door concept. Exporters are therefore encouraged to discuss every planned shipment with PPECB shipping personnel, to ensure that arrangements are made timeously to ensure optimum product handling.

The following requirements and recommendations are designed to minimise product quality loss and to ensure most optimum handling procedures with minimum delays.

4.2 Conditions for the use of open door containers / open side containers

Standard general purpose (GP) containers with doors removed or secured partially open, are sometimes used for the carriage of ventilated, less temperature sensitive cargo, over short distances.

The use of open door and open sides containers for specific products and destinations will be considered by the PPECB in consultation with the exporter, because of the potential risk involved.

PPECB will only accept a booking for an open door container if:

- The sea voyage is not more than ten (10) days. An additional maximum of 3 days may be considered for certain produce, packaging methods, season or destinations.
- Product in packaging like knitted jute or polypropylene bags will be allowed, during any delay within the maximum period of 10 to 13 days.
- Transshipments are not recommended and should be avoided.
- No other suitable shipping equipment or alternatives are available.
- By accepting a booking the shipping line approves this method and shipping conditions and must therefore adhere to the special PPECB instructions.
- Loading will only be accepted if the Master allows open door containers on board.
- Should a container being delayed or short shipped, then the product must be re-inspected prior export.
- PPECB to audit these during their daily audits within Portnet terminals.
- Any broken or loose tarpaulins must be reported to the Line and Exporter.

4.3 Container requirements

The container is registered by ISO in Paris (i.e. has a valid container number) and has a valid safety certificate (CSC plate).

It must have a sound, rust free and a sturdy steel frame.

The inside of the container must be clean, dry and absolutely free from any foreign taint or odour.
Container depots must arrange for a PPECB cleanliness inspection, at least 24 hours prior to anticipated container loading.

Hooks must be fitted to the door end to tie wire netting to prevent cargo from falling out of the container. Other effective cargo securing methods will also be considered by the PPECB. A clean tarpaulin must be supplied by the shipping line, to cover the open door during inclement weather at sea.

### 4.4 Cargo loading requirements

The containers must be loaded to ensure adequate fresh air ventilation throughout the total load. Following requirements must be adhered to:

- All products must be inspected by PPECB Assessors and must meet the quality standards promulgated by the RSA Department of Agriculture.

- Requests to deviate from the official standards must be addressed to the PPECB, who will then apply for a dispensation with the Department of Agriculture.

- The cargo must preferably be palletised or if loaded break bulk, a layer of pallets must be placed on the floor. Fork lift openings must run lengthwise to ensure an unobstructed air plenum to the bulkhead.

- Dunnaging of at least 100mm may be used instead of pallets. Unobstructed air passages must be provided lengthwise (door to the bulkhead). Dunnage may also be used in openings between pallets on the floor.

- Wooden pallets (at least 2) must be stacked vertically against the bulkhead, to ensure vertical movement of air from the floor to the ceiling.

- A horizontal layer of wooden pallets more or less in the middle of the cargo load is strongly recommended to ensure fresh air circulation and to avoid a heat build-up in the centre of the load.

- Onions and potatoes, should be loaded with flat dunnage between the different layers of bags. **Potatoes must be packed in woven bags if the total time in the container exceeds 10 days.**

- An opening of at least 200mm must be left between the top of the cargo and ceiling. This air accumulation plenum is very important, because it creates a chimney effect assisting vertical air movement.

- The maximum permissible load must not be exceeded to avoid accidents or rejection at the point of crane handling.

- All containers packed prior to arrival of the vessel must be kept under cover with doors open. Provision must be made for maximum fresh air circulation in the storage space to minimise condensation on the product.

### 4.5 Stowing open door containers on deck

PPECB will only allow loading of containers on board a vessel if:

- A container is stowed with the doors open and properly secured.

- Container doors face aft to ensure that only clean, dry unpolluted fresh air is circulated around the product.
The Master confirms that container doors will be closed during inclement weather or that tarpaulins will be provided and will be rolled down to protect the cargo from any ingress of rain and seawater.

The Master undertakes to keep accurate records of opening and closing of container doors or the use of tarpaulins, to ensure that cargo is kept dry.

4.6 Cargo protection

The cargo must be well protected and sufficient fresh air ventilation applied during storage, handling, transport and shipping of open door and flat rack containers. The following requirements must be adhered to:

- Loaded container must be stored under cover awaiting transport. The doors must be kept open and the storage area must be very well ventilated.

- Loaded open door containers, may not be stored for more than 3 days prior to the departure of the vessel. This is to ensure a maximum storage period of 13 days (pre-shipment plus voyage) in the container.

- Containers must be stored under cover with the doors open in the terminal where possible or, arrangements must be made for direct delivery prior to shipment and during transshipment.

- Water must never be allowed to enter the container. Container doors must be closed when exposed to rainy or inclement weather during storage, transport and the voyage. The doors must be opened immediately when danger of water ingress disappears. All wet cargo must be rejected and will have to be re-inspected prior export.

- Open door containers will only be allowed under deck, if the PPECB is satisfied that there is at least one complete fresh air change per hour and at least 90 air circulation's per hour.

4.7 Port Discharge Procedures

It must always be remembered that all ventilated shipments can result in fast product quality loss and that the product must be marketed as soon as possible.

It is therefore of utmost importance that the exporter ensures that the following procedures are followed after discharge in the importing country:

- The importer and buyer must be made aware of the fact that the product was shipped under less than optimum conditions. The fact that the product met PPECB export standards at time of container loading, does not imply that it will arrive in a good condition two weeks later under uncontrolled environmental conditions.

- The importer must remove the container(s) from the port immediately after discharge and the container must be unpacked within six (6) hours after discharge. This is to avoid condensation forming on the product resulting in decay.

- The importer must never store the products in a closed container. Container doors must only be closed during discharge, port handling and transport to the final destination.

5. COMPROMISE PRODUCT MIXES

5.1 General

The aspect of mixed shipments in the same shipping compartment (container, deck) confirms various problems of which the most important ones can be summarised as follows:
5.1.1 **Product quality**, i.e. all actions must be directed towards what is in the "interest" of the product. A sure way of killing the market is to supply products of inferior quality, short shelf life, high waste potential and tainted with foreign odours or tastes.

5.1.2 **Costs** must be kept to the absolute minimum not only to completed, but also because of the economical situation of the region. Sophisticated refrigeration equipment is not always available and if available, is extremely expensive.

5.1.3 **Market situation** requires small but frequent deliveries of a wide range of products. It can almost be described as a "weekly shopping" exercise.

5.1.4 **Transport conditions** vary from moderate temperatures to very hot conditions. Humidities are extremely high most of the time with condensation forming on the product, in the containers aggravated by rain and seawater spray.

5.2 **Requirements**

With the above in mind and also the fact that the voyage is usually between 4 and 10 days to West Africa or I.O.O., PPECB wants to:

5.2.1 Confirm that compromise temperatures and product mixes are not conducive to good quality maintenance.

5.2.2 Confirm that PPECB will allow certain compromise mixes only because there is no alternative to the buyer or the exporter.

5.2.3 Confirm that neither the PPECB nor the shipping line or supplier of equipment can take any responsibility for quality losses as a result of compromise product and temperature mixes requested by the exporter/importer.

5.2.4 Confirm that requested compromise procedures will not be allowed if it may harm the product, the export industry or negatively affect other exporters/importers.

5.2.5 Request that all exporters explain the situation to overseas buyers and importers and request them to combine their orders in such a way (volumes and products) that more optimum shipping conditions can be applied.

5.2.6 Inform exporters and importers that South African produced fresh produce may not require that same conditions or may behave/react completely different than the same produce produced elsewhere.

6. **TYPE OF CONTAINERS**

6.1 **Fantainer**

Is either an insulated or non-insulated container, fitted with a fan for extracting stale air from the container. Therefore the direction of the fan must be checked, to ensure that it extract air.

This fan can be fitted at the air intake ducts, or at the back of a partly opened door.

These containers can only be stowed on deck and are plugged in to the vessel's power source and can only be used for unprecooled ventilated shipments.

6.2 **Open Top or Open Side**

It is either an insulated or non-insulated container, which is converted to carry cargo unprecooled on deck, under ventilated conditions.

Open Top containers can only be stowed one high. Allow enough space between Open Sides, to allow for proper air circulation.
6.3 General Purpose (GP)

Ordinary non-insulated containers, which are used to carry cargo uprecooled on deck under ventilated conditions with doors partially open.

These shipments are commonly known as “open door” shipments.