

SA Masterclass on Special Cargo

Handling



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Topics covered

- Dangerous Goods/Hazardous Goods
- Heavy/Outsized cargo or Out of Gauge (OOG)
- Perishable Cargo/ Reefer Cargo

Perishable Cargo / Reefer Cargo

What we intend to cover ?

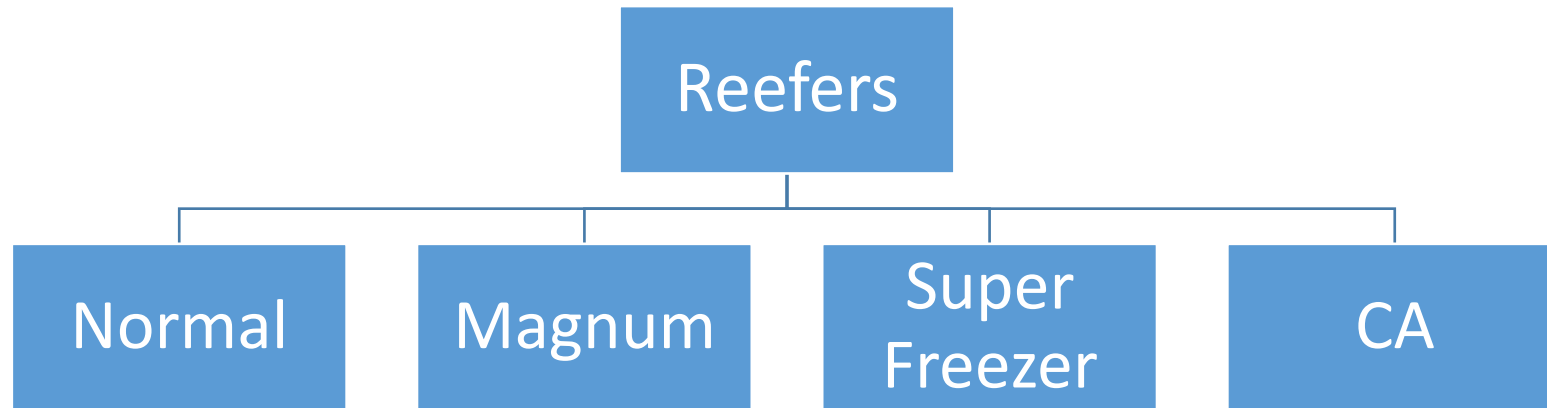
1. What is a Reefer Container & its types?
2. What do you mean by Reefer cargo & Perishable Cargo?
3. What steps to follow when handling reefer cargo
4. Check List – Important to ponder
5. How the reefer container works?
6. Chilled & Frozen
7. Cold Treatment
8. Booking Process
9. Probe? When do you use this?
10. Documents required when handling reefers
11. Hot- Stuffing
12. What is a Super Freezer & why we need to use it?
13. Super Freezer Operation



What is a Reefer Container ?

A REEFER CONTAINER is a short form for REFRIGERATED CONTAINER.

What are the types Reefer Containers ?



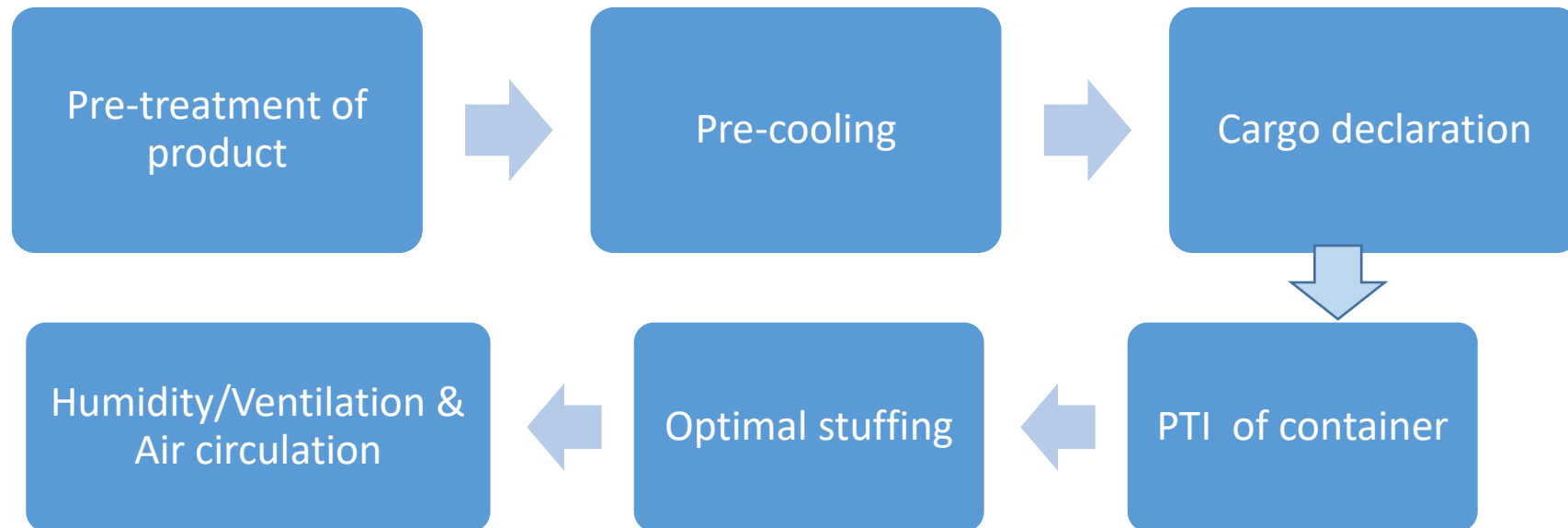
What is reefer cargo ?

- Any thing or shipment that requires controlled temperature environment
- Cargo or loads that can only preserves its quality under a special temperature
- All cargo comes under perishable category
- CA - **Controlled Atmosphere** - control the ripening process of your fruit and extend your product's shelf life.

What is Perishable Cargo?

- The products that can deteriorate due to not keeping or transporting them under appropriate conditions or heat and humidity.
- Perishable products can lose their vitality with time unless the appropriate standards do not provide or if they expose to excessive heat.

What steps to follow when handling Reefer cargo ?



Humidity is a term for the amount of water vapor in the air,

Ventilation: Ventilation is the process by which 'clean' air (normally outdoor air) is intentionally provided to a space and stale air is removed. This may be accomplished by either natural or mechanical means.

Pre-cooling, treatment & handling of a reefer container

Pre-treatment of reefer products prior stuffing

The condition of reefer products before they are stuffed plays an important role in their condition upon arrival. That is why it is essential that all products are treated correctly prior to stuffing.

Pre-cooling of cargo

The proper pre-cooling of products will have a positive effect on both shelf life and out turn, compared to products that have not been pre-cooled. Reefer containers are built primarily to maintain the temperature of the products, therefore, products should always be pre-cooled to the required carriage temperature prior to being loaded into the container.

No pre-cooling of reefer container itself

Pre-cooling of the reefer container itself should never take place. Once the doors of a pre-cooled container are opened, hot ambient air will meet internal cold air, resulting in a large amount of condensation on the interior surfaces.

Check list when storing reefer cargo



1. Cargo should not be stuffed beyond the end of the T-floor

2 Cargo should not be stuffed above the red load line

Cargo must be stable on the floor and tightly wedged so it doesn't shift during passage

3. Unit must always be set at the proper carrying temperature and this set temperature will vary according to the cargo being loaded whilst allowing air circulating near the doors

4. Dehumidification controls must be checked. If pre-cooling is required, it must be the cargo that is pre-cooled and not the container,

Onboard refrigerated cargo is to be monitored and should be maintained at their required temperatures

Check list when storing reefer cargo – Continued.....



5. unless the container is loaded in an air locked cold tunnel in the cold storage
Ventilation setting is of utmost importance and must be set at the correct level

6. As air will follow the path of least resistance, there should not be any restrictions for air flow and any gaps between the pallets and the doors must be closed using cardboard or even wood. This will then force the air to circulate correctly and reduce the potential for heat sinks (warm air continuously circulating) near the doors

Onboard refrigerated cargo is to be monitored and should be maintained at their required temperatures

How the reefer container is working ?

Reefer containers are bottom air delivery units designed to distribute chilled air from the floor, via specific T-shaped decking, with the advantage of producing a consistent and uniform flow of air across the entire shipment, powerful enough to ensure a perfect air exchange with the goods.



Container interior : T floor and walls

Crucially, cargo should be cooled to the desired carrying temperature prior to loading. **The reefer unit is not intended to cool cargo down, merely to maintain the set point temperature.**



Container interior : T floor and walls

Lower the temperature

- Minus 18 degree Celsius
- Minus 20 degree Celsius
- Minus 35 degree Celsius
- Minus 60 degree Celsius

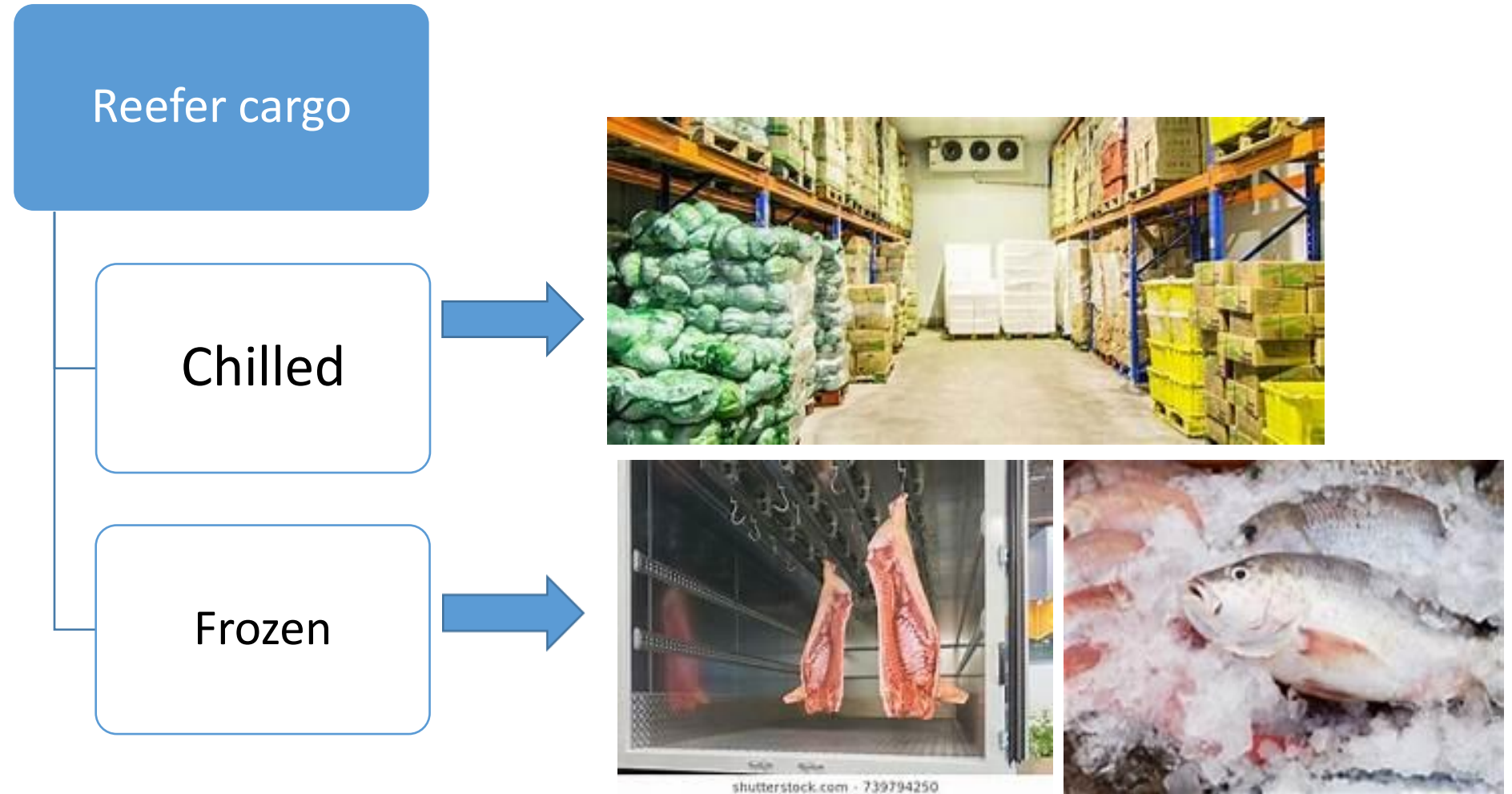
Warm-up the goods

Between 0 to 35 Celsius

Not to reduce Temp

Maintain pre-cooled cargo temperature

What are two main types of reefer cargo ?



Reefer cargo

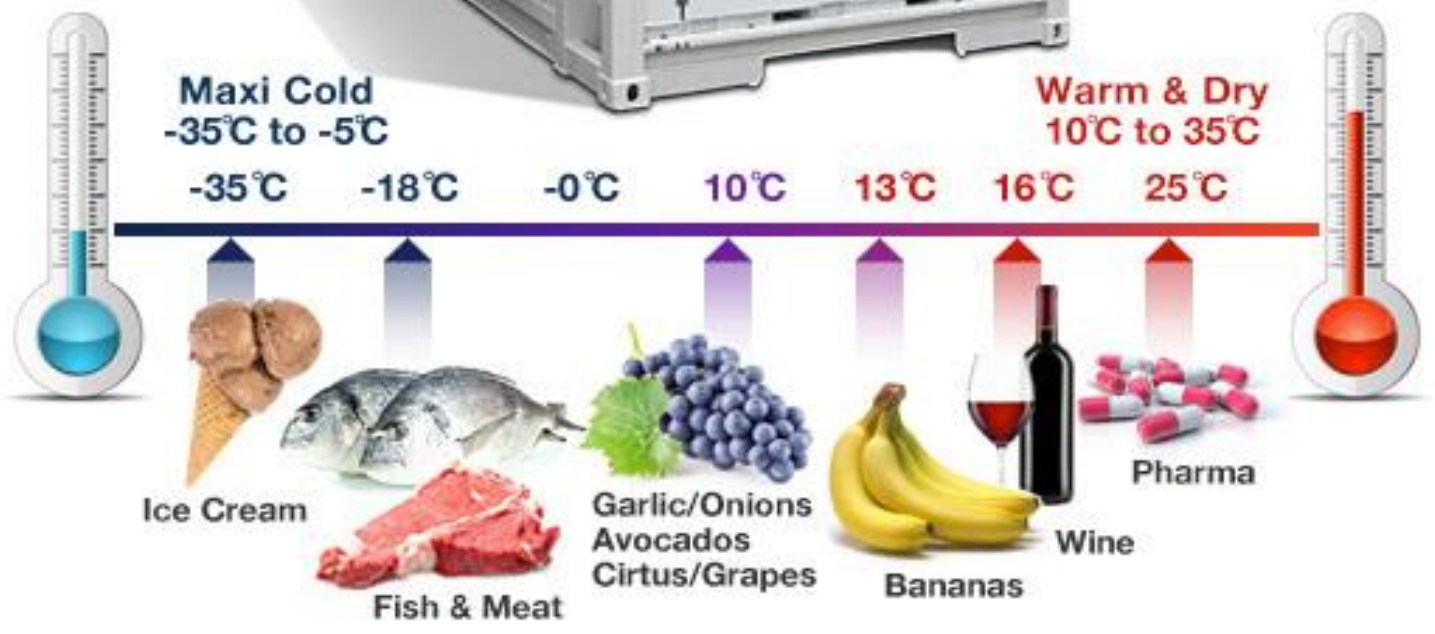
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graph TD; A[Reefer cargo] --- B[Chilled]; A --- C[Frozen]
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Chilled

*in the case of **chilled** cargo, air has to flow **through** the cargo at all times so that heat and gases are removed, therefore the cartons used should have ventilation*

Frozen

*in the case of **frozen** cargo, air has to flow **around** the cargo so there should be no gaps between the cargo and the walls and the cargo itself, so the cargo has to be block stowed*



Maxi Cold
-35°C to -5°C

Warm & Dry
10°C to 35°C

-35°C -18°C -0°C 10°C 13°C 16°C 25°C



Ice Cream



Fish & Meat



Garlic/Onions
Avocados
Citrus/Grapes



Bananas



Wine

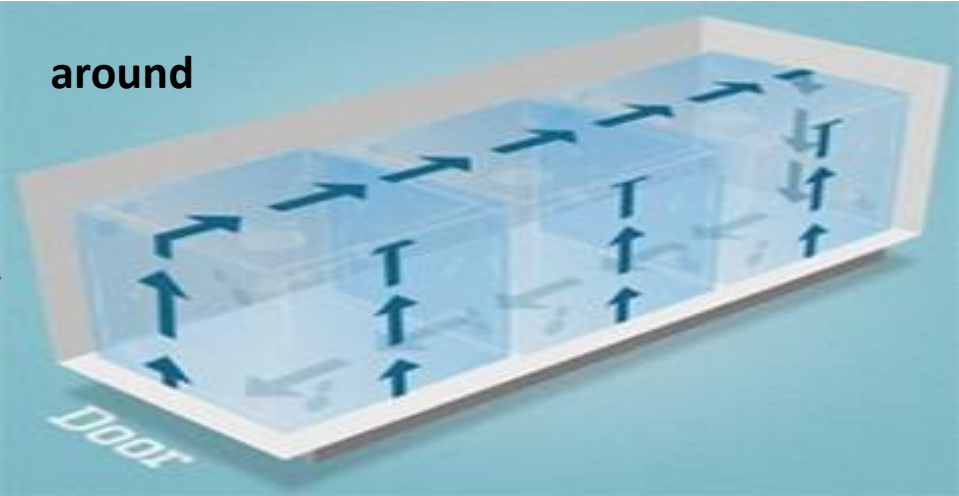
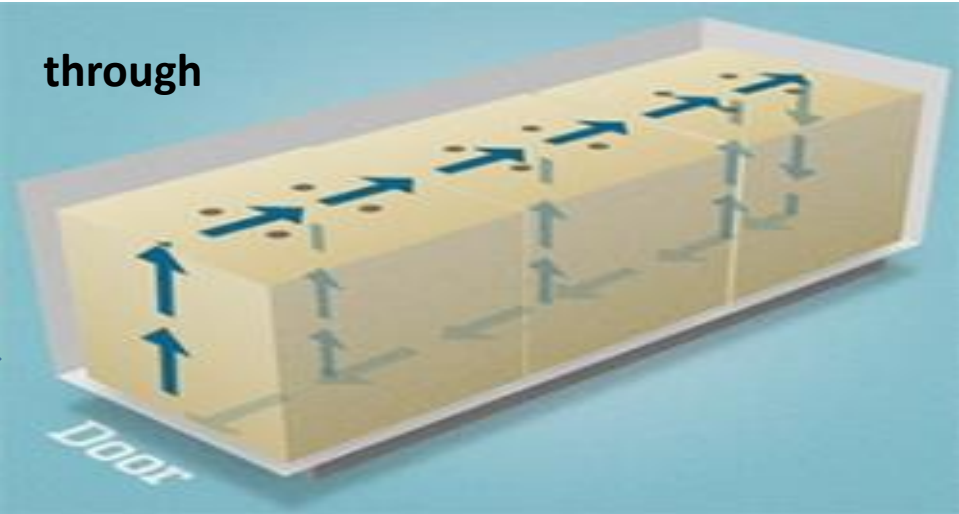


Pharma

Reefer cargo

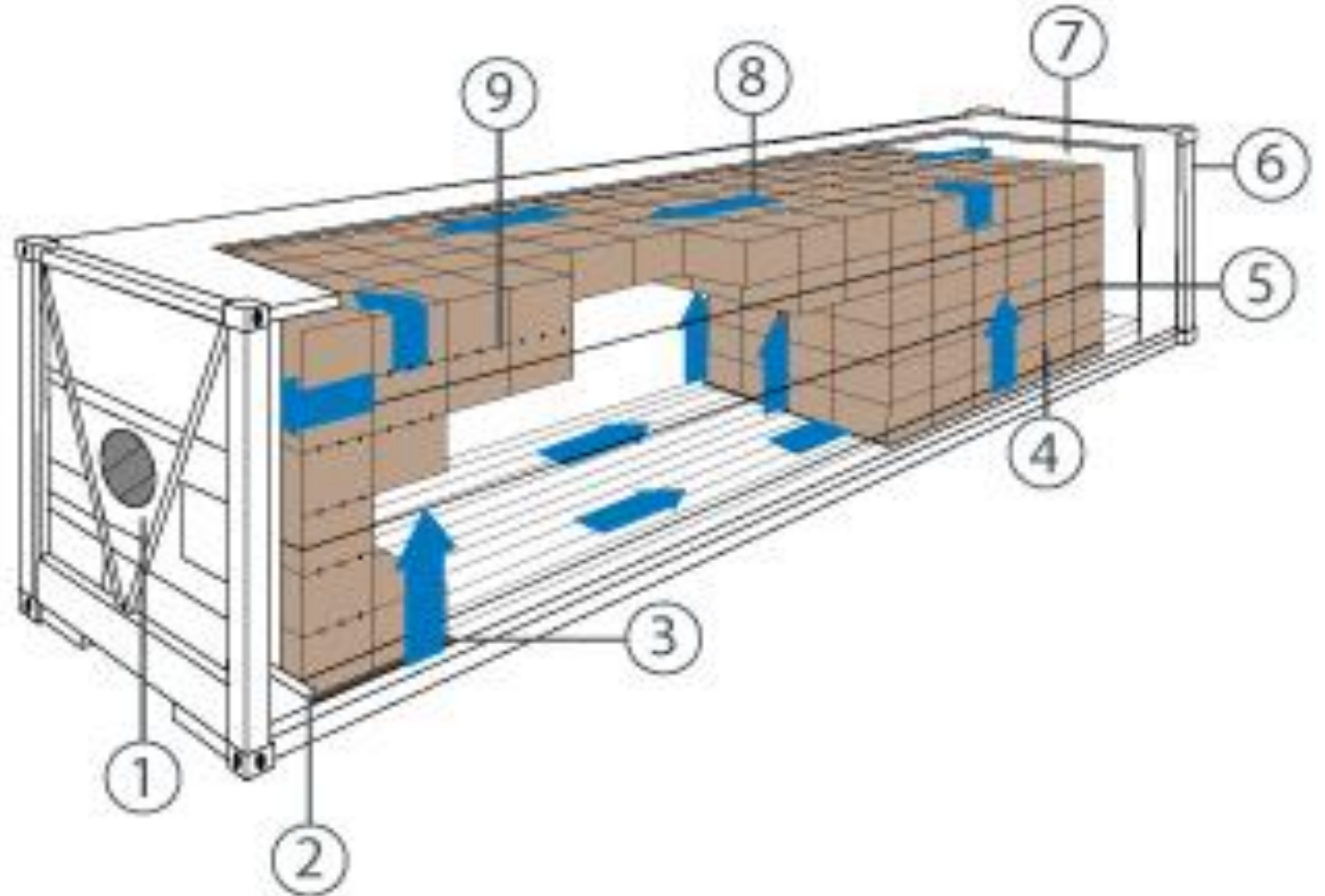
Chilled

Frozen

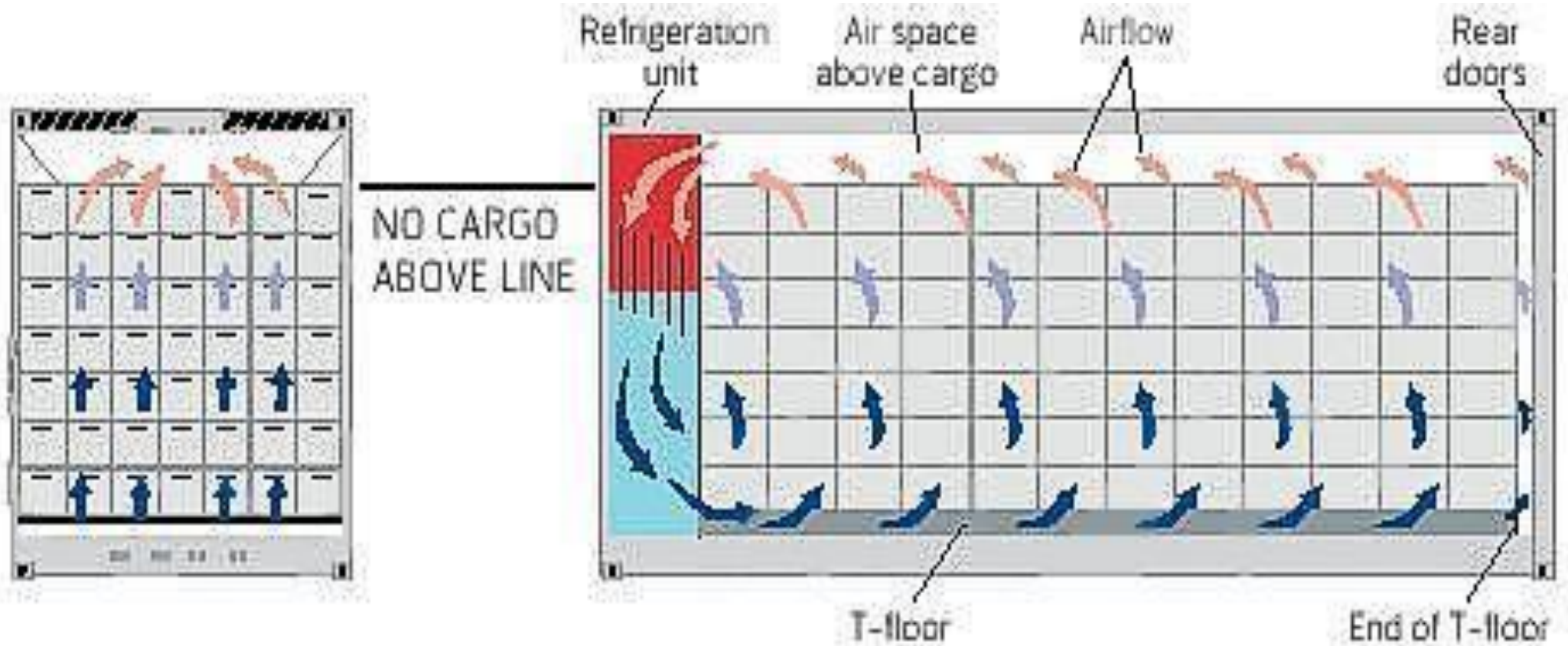


Stowage Principals to Follow when stuffing

- 1 Refrigeration unit
- 2 Boxes do not extend beyond pallet
3. Deck board spacing allows vertical airflow
4. Boxes vented for vertical airflow
5. Pallet load is secured
6. Rear doors
7. Air space above cargo
8. Airflow
9. Box vents aligned (Ventilated holes)

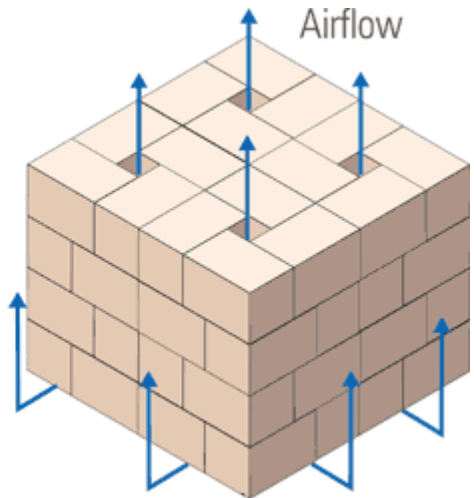
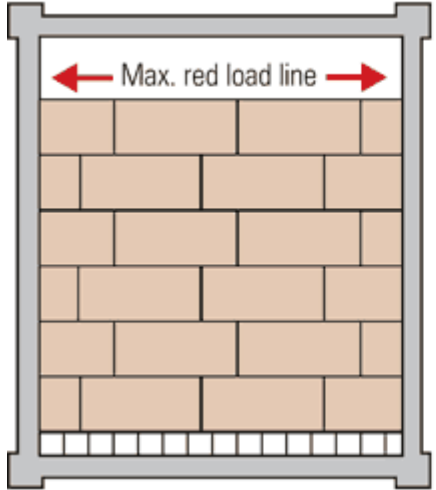


Correct way of stuffing chilled & frozen cargo

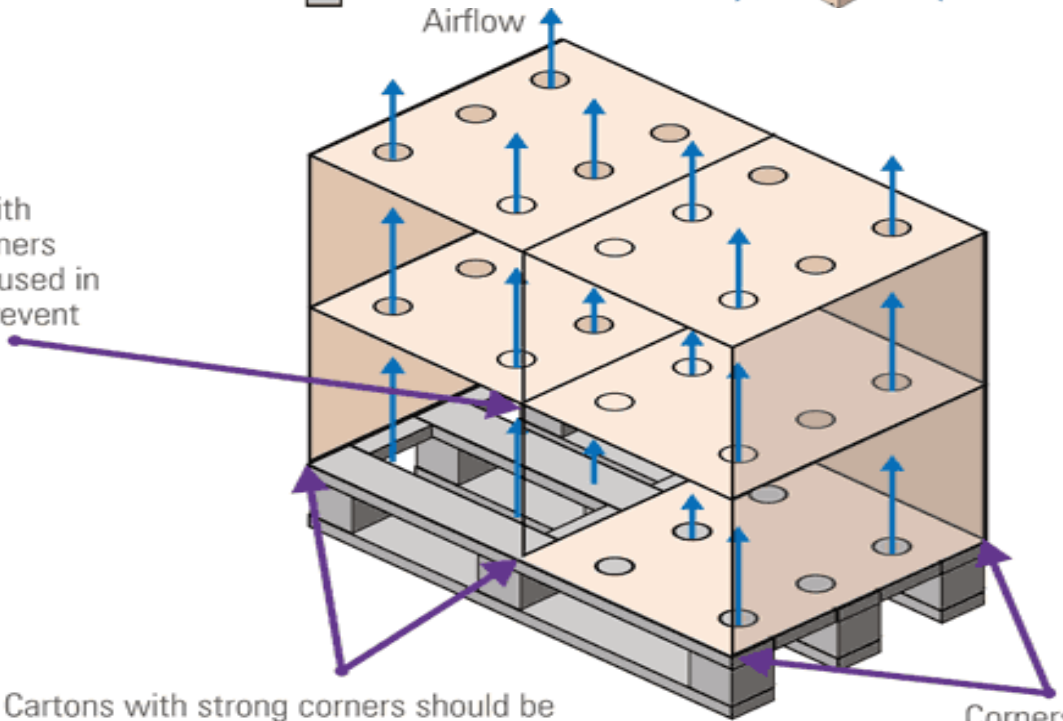


The correct way to stuff a bottom air delivery container with chilled or frozen products

Correct way of stuffing of palletized cargo



Cartons with strong corners should be used in order to prevent crushing.



Cartons with strong corners should be used in order to prevent crushing.

Corners of cartons need to be supported by pallet.

Prior to stuffing

- Ensure only clean reefer container is accepted from depot(odor, condition, cleanliness & insulation etc.)
- Check the refrigerating machinery (temp recorder, supply and return air etc..)
- Ensure that the data recorder back-up battery is fully operational
- Frozen cargo: Ensure fresh-air vent is closed. Chilled: Set fresh air vent as required and unit is set at carrying temperature.
- Check if it is a valid reefer – CSC Plate
- If a genset is attached to a container, switch it on and check that it is running properly
- Observe the use of adequate packaging material

- Fill in customer commodity sticker on the package if applicable
- Keep in mind plastic wrapping may act as vapor barrier and prevent air circulation around the product
- Ensure your product temperature reflects transport temperature before stuffing commences
- Your reefer cargo should preferably be sourced from a refrigerated loading bay

Preparation of cargo for the container

- Frozen cargo: Pre-freeze before loading.
- Chilled: Pre-cool cargo before loading.
- Ascertain the range of temperatures that all cargo can be carried.
- Ascertain any carrying instructions that are applicable to the cargo.
- Adequate wrapping for frozen cargo.
- Packaging is strong, adequately ventilated and waxed/laminated.
- Cargo to be good quality and properly sanitized.
- Ensure cargo is not damaged or susceptible to damage enroute due to current weather.

Stuffing of reefer containers – During Stuffing

- Switch off the power unit during loading operation to avoid ambient air exchange
- Ensure product is evenly stuffed in correct manner to avoid obstructions that can result in hot spots. In other words cartons should be stacked directly on top of each other.
- Any holes in chilled goods should line with the holes in cargo beneath it.
- Do not stack boxes above load line; space above the load line will help to stabilize cargo and ensure optimal airflow
- If palletized then the corner of each carton should be supported by the pallet
- If wrapping pallets with plastic then do not cover the top or bottom.
- Avoid poor air circulation which is amongst primary causes of product deterioration
- Any free floor area and gaps may not exceed 5% of floor area to avoid negative impact on airflow
- Use board or dunnage material to avoid gaps and open floor areas
- By effective blocking, force air through the cargo(For chilled cargo)
- Do not load cargo beyond surface provided by "T-Bar" flooring inside the container
- To ensure free airflow, no space between cargo units permitted in front of unit air distribution point
- Adequate refrigeration relies on good air circulation around your entire load
- Place a weatherproof placard on container door and/or next to the temperature readout stating the minimum/maximum carrying temperature and instructions such as atmospheric conditions.

After completing loading operation

- Close doors properly
- Ensure correct set point for carrying temperature, humidity and setting of air ventilation
- Start up reefer power unit



Cold Treatment. What is this?

Due to some fruit types carrying potential **pathogens**, some importing countries like China, Japan, Nigeria, require cold treatment of the fruit (colloquially known as Steri shipments).

Steri Shipment?

With this form of shipping, the fruit would be pre-cooled to a lower temperature than the commercial market. For an example Citrus, Oranges & Grapes and Apples

What is a Probe ?

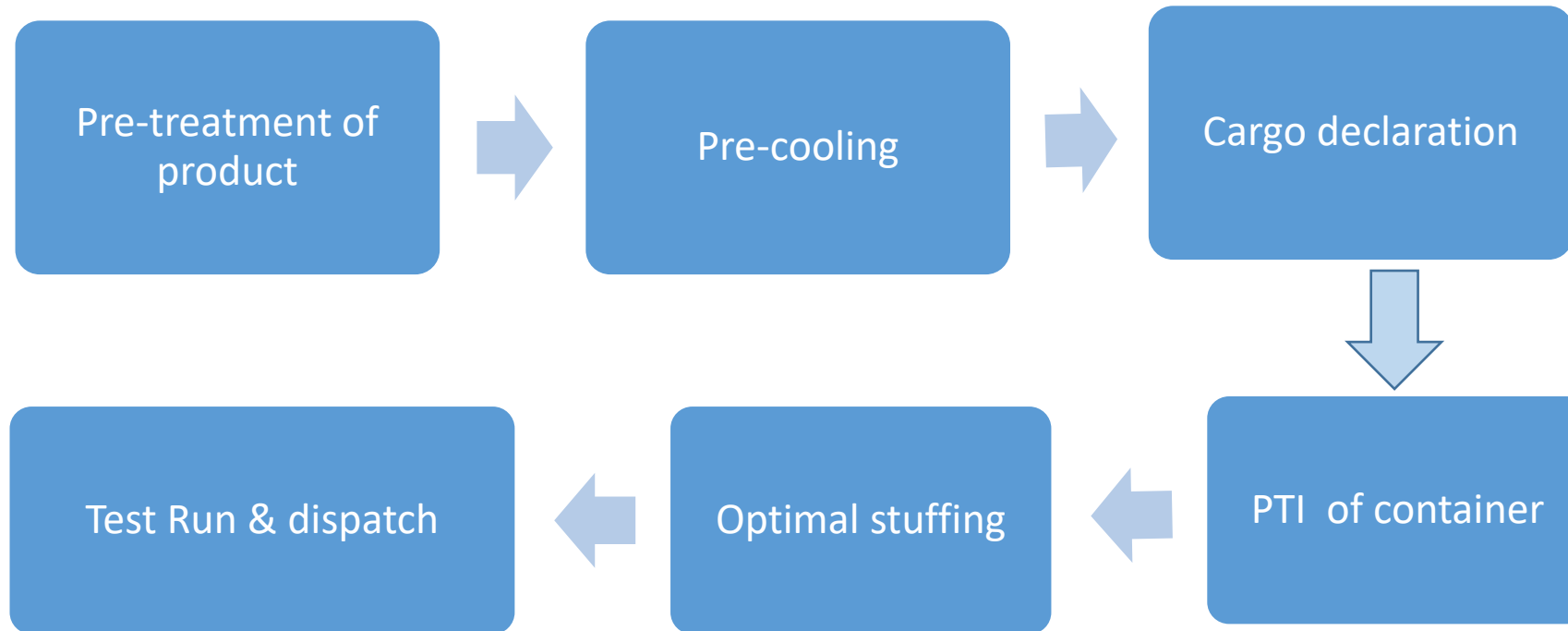
In order to monitor this, an electronic device (probes) is inserted into the pulp of the fruit, or cargo whilst in the mode of package etc. Within the carton or poly bag or naked. 0 to 03 probes are used per shipment. There is a minimal tolerance allowed in temperature variance which is + or – 5 degree.

Should one of the probes drift above the tolerance, the cargo will be rejected at country of destination, due to the potential of the fruit still retaining pathogens.

Should the units be packed correctly and cargo post-harvest process followed, barring the unit failing, cargo can be received by the customer on a ready to eat basis or even for further storage.

pathogens include Salmonella, Neisseria, Brucella, Mycobacterium,

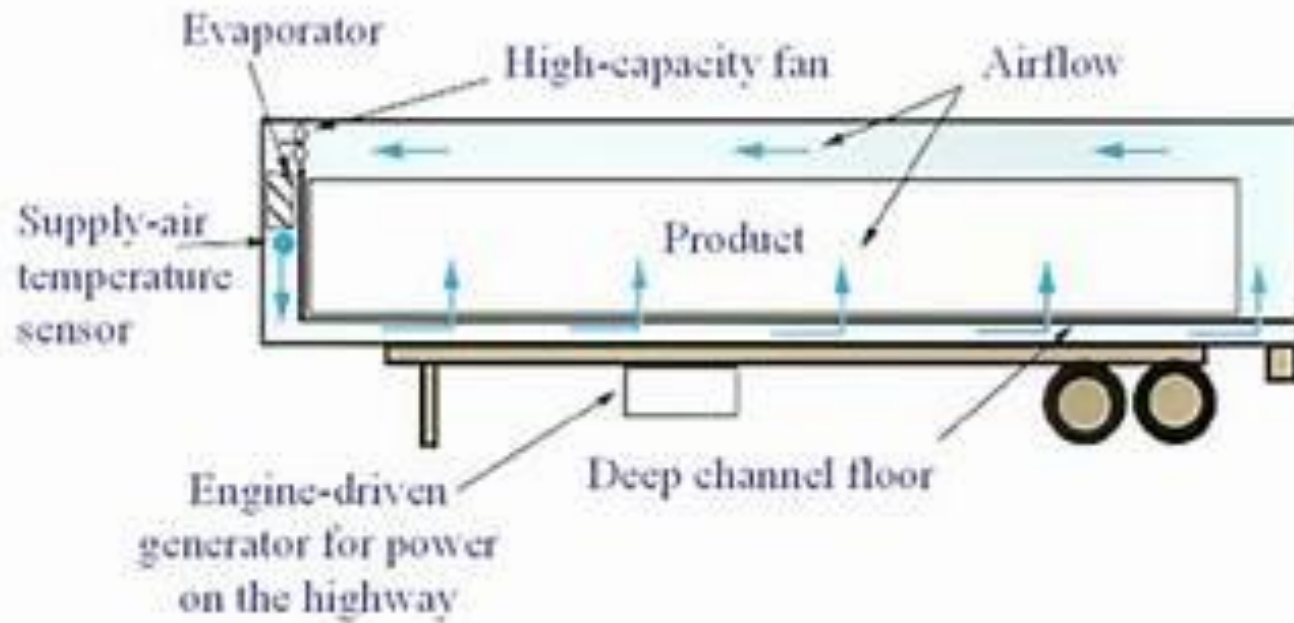
Following steps *MUST* be complied before making a Booking



Test Run - Needs ensure SET TEMP is running through. Inspecting and testing should be carried out by qualified personnel and a certificate issued.,

Dispatching – Ensuring an uninterrupted cold chain irreadless of the distance to the port or terminal where laden containers are stowed prior to loading onboard the vessel . In such cases containers fitted with clip-on units are usually used.

Types of Probes in operation for reefer cargo



Vessels' operation for reefer cargo

- Cargo is called down to port by vessel prior to at least 24 hours before vessels ETA
- No sooner the containers arrival at port, power supply needs to be given
- Reefer monitoring needs to be consistently done by supervisors
- If **RCM** devices are fixed in reefer containers, monitoring can be done from remote
- Carriers do Remote Temperature Monitoring & GPS Tracking For Reefers
- Shippers are allowed to make use of Probes and GP tracking devices at the time of stuffing of cargo if a need be
- HOT-STUFF cargo is allowed to take on board by the Master of the vessel if difference between SET temp and RUNNING temp is + or – 5 degree in Celsius
- Sooner the reefer containers are taken on board, power supply is given by the crew who are specialized in handling reefers on board
- It is always prudent to follow carriers guide line & instructions in handling operation

RCM - Remote Container Management

Documentation required and clearing procedure

1. Cargo declaration through PTI document – Can be considered as a booking note – [A sample to ponder](#)
2. Temperature settings instructions form – If a need be
3. Letter of Indemnity for HOT – STUFFED containers
4. CUS DEC + CDN
5. Approval of authorities for allowing the shipment – E.g.:- Quarantine Certificate, approval from country of destination etc..
6. Any other special requirements to be guided by the operation. For an example - Perishable Products Export Control Board (PPECB) certification in South Africa - PPECB provides a quality certification and cold chain management services for producers and exporters of perishable food products.

Common mistakes we often come across.

1. Confusion over Celsius and Fahrenheit , **0 C = +32 F , 0 F = -17.7 C**
2. Poor communication of requirements (plus versus minus temperatures)
3. The container not monitored or plugged in throughout its journey.
4. Malfunctioning of container and data logger equipment
5. Lack of Understanding the correct requirements for the specific cargo being transported and verify them
6. Not Ensuring an accurate information is passed through the contractual chain.
7. Negligence over pre-cooling of cargo resulted in **HOT – STUFFING**
8. Ignoring of supplying power whilst the container in transit to port
9. Other factors such as processing methods, packaging materials and packing methods also influence potential quality changes within the product.

A container of lobster, for instance, could hold a value in excess of £ 250,000/ LKR 55 million

How HOT – STUFFING can happen?

$$\begin{array}{r} C \\ \text{---} \\ 5 \end{array} = \begin{array}{r} F - 32 \\ \text{-----} \\ 9 \end{array}$$

If cargo is not pre-cooled prior to stuffing , a situation of HOT-STUFFING can happen.

What do you mean by HOT – STUFFING:-



Normal Temperature dropping rate is **1 degree** per day in a reefer container

Difference between set & return TEMP is 6 degrees which may not be acceptable to the master of the vessel. **Because ratio of tolerance is + or – 5 degree for acceptance.**

A shipper-owned container (SOC)will not anyway be accepted in hot stuffed condition. If for line owned container , Carrier is to be indemnified for all loss/claim/damage to cargo requiring special heating/cooling in the event of malfunction while in the carrier's custody.

Transporting Perishable Goods via Air Freight

Transporting perishable goods via air freight is a highly time-sensitive and specialized process that demands meticulous attention to detail.

Whether you're shipping delicate food products that need to maintain their freshness, life-saving pharmaceuticals that require strict temperature control, or other temperature-sensitive goods.



Expert tips to navigate the process with confidence.

- **Selecting the Appropriate Packaging** - Insulated containers, such as coolers or temperature-controlled packaging, should be used to maintain the desired temperature range throughout the journey. Consider the perishable's specific temperature requirements, duration of transportation, and any potential external factors that may impact the cargo.
- **Temperature Control and Monitoring** - Maintaining the correct temperature is vital to prevent spoilage and maintain the quality of perishable items. Work closely with your logistics provider to ensure proper temperature control throughout the entire shipping process. Use temperature monitoring devices and data loggers to track and record temperature fluctuations, allowing you to intervene if necessary.
- **Compliance with Regulations** - Familiarize yourself with the regulations and requirements imposed by relevant authorities, such as the International Air Transport Association (IATA) and local customs agencies. Understand the necessary documentation, permits, and certifications needed for transporting perishable goods. Compliance with these regulations will help avoid delays and ensure a smooth transport process.

Food and Drug Administration (FDA) in USA

United States Department of Agriculture (USDA) in USA

International Organization for Standardization (ISO)

Customs and Border Protection (CBP) in USA

Local Health and Food Safety Authorities – Such as Food Control Administration Unit (FCAU) of the Ministry of health, Phytosanitary certification from Department of Quarantine etc.

- **Timing and Scheduling** - Time is of the essence when shipping perishable items. Coordinate with your logistics provider to establish a suitable transportation schedule that minimizes transit time and maximizes the freshness of your goods. Consider potential delays or disruptions and opt for expedited or direct flights whenever possible.
- **Partnering with a Reliable Logistics Provider** - Choose a reputable logistics provider experienced in handling perishable goods via air freight. Ensure they have robust quality control measures, reliable temperature-controlled facilities, and a track record of successful and timely deliveries. A knowledgeable logistics partner can offer valuable guidance, handle documentation, and navigate potential challenges effectively.
- **Communication and Visibility** - Maintaining clear and open communication with all parties involved in the shipping process is essential. Stay in constant contact with your logistics provider to receive real-time updates on the status of your shipment.

Cool containers - ULDs

If you transport by air temperature-sensitive cargo like food and pharmaceuticals, you know how important it is to guarantee an unbroken cold supply chain.

There are certified temperature-controlled containers also known as air cargo refrigerated containers do just that.



What is SF – Super Freezer Container

The Super Freezer Container is a high-tech container specifically designed for transporting frozen goods. Unlike ordinary containers, it is equipped with a specialized refrigeration system, capable of maintaining a constant low temperature, typically ranging from -60°C to -25°C.

In always come in 40ft in size.

The minimum temperature of 40ft super freezer container could reach up to -60 Degree Celsius. (-76FC).

It' can be frozen tuna fish without CO2 gas injection to maintain the color and flavor of fresh fish.40ft reefer container is a kind of special transportation equipment that has good thermal insulation, airtight, and can maintain low temperature during transportation.

Image of SF

Super Freezer 40ft Frozen Container Photo



Super Freezer Container (-60°C) Features

- Temperature range of -60°C to -10 °C
- Designed for long-distance transportation and storage of deep-frozen cargoes
- Super Freezer Container (-60°C) can be fitted with T floor/flat floor,



Types of containers used in SF operation

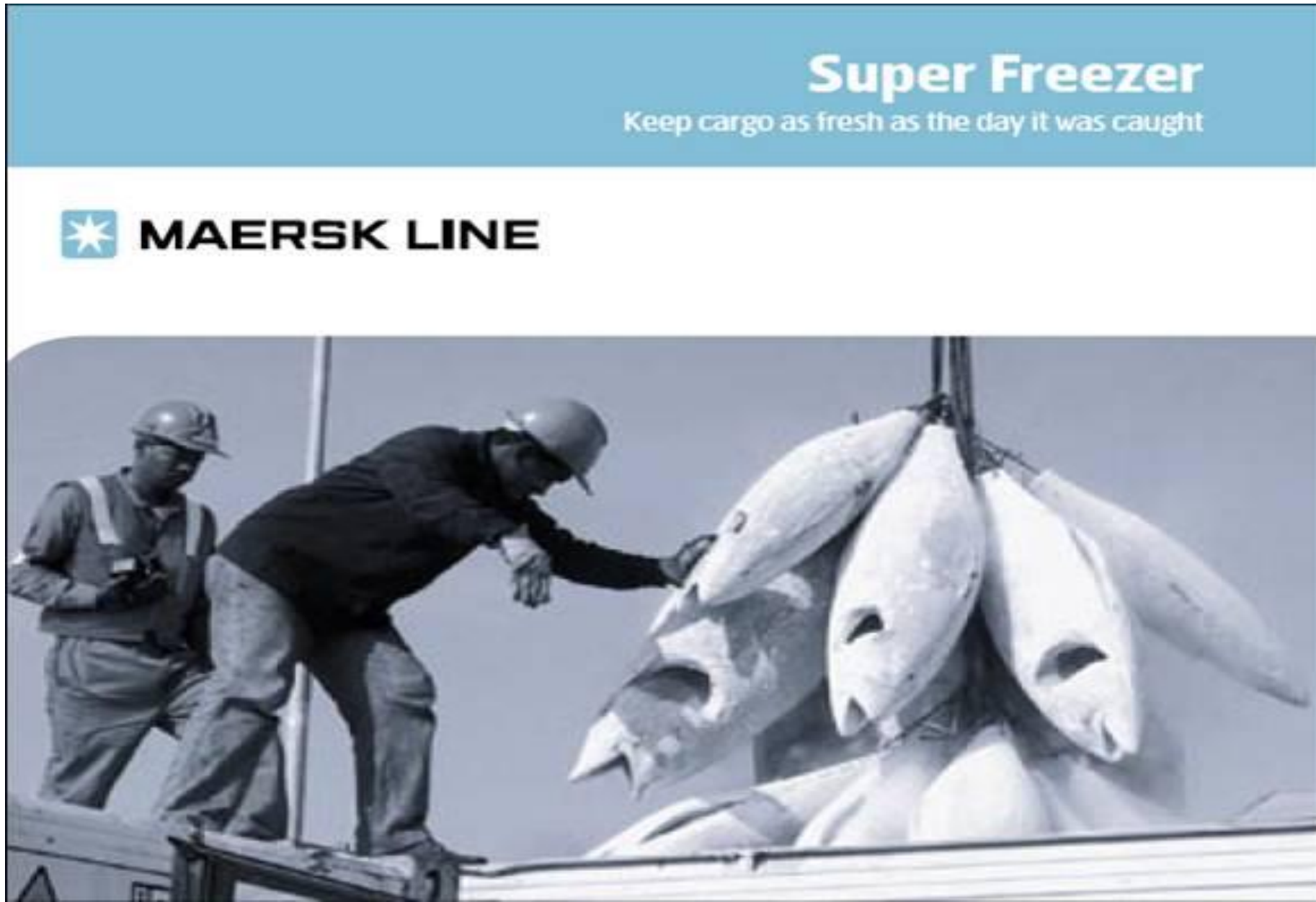
- Sortie Container
- Stuffie Container
- Magnum Container
- Normal Reefer Container
- SF Container

Sortie Container

This facilitates to sort/segregate types of reefer cargo, Tuna Fish in particular when unloaded from the trawler prior to stuff sorted cargo in to SFs by using Stuffie containers (if need be)



Placing the rope on the top hold of Sortie



Tuna Species / Seasonality

Item	Ocean	Season	Size
Blue Fin	Mediterranean	Feb – May	200 kgs / fish
S. Blue Fin	Indian Ocean	May – Sep	15%: 60 – 80 kgs / fish 30%: 25 – 40 kgs/ fish 55%: 15 – 25 kgs / fish
Big Eye	Atlantic	Full Year	
Yellow Fin	Indian Ocean	Mar - June	

Taiwan Fleet Catching Area

- Atlantic Ocean – Las Palmas / Cape Town / Dakar / Montevideo / Port of Spain.
- Pacific Ocean – Pago / Suva / Honiara / Papeete.
- Indian Ocean – Port Louis / Reunion / Durban / Singapore / Colombo / Muscat.

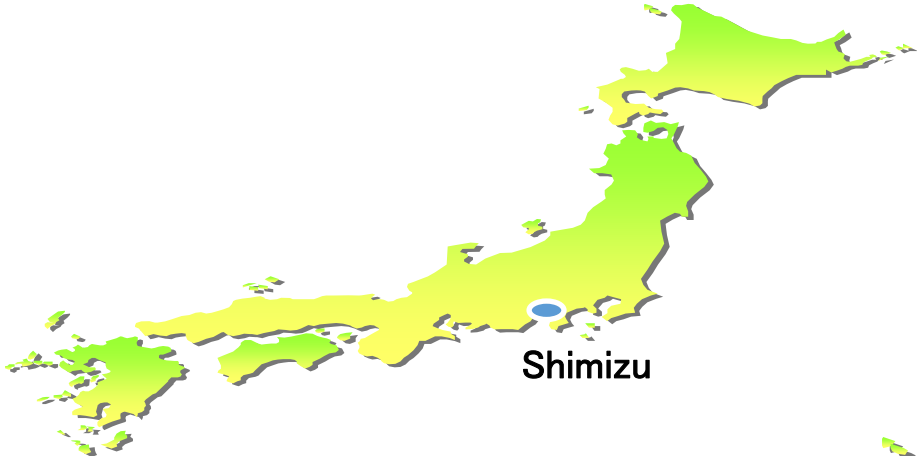


Super freezer Acceptance And Cargo Protection Procedures

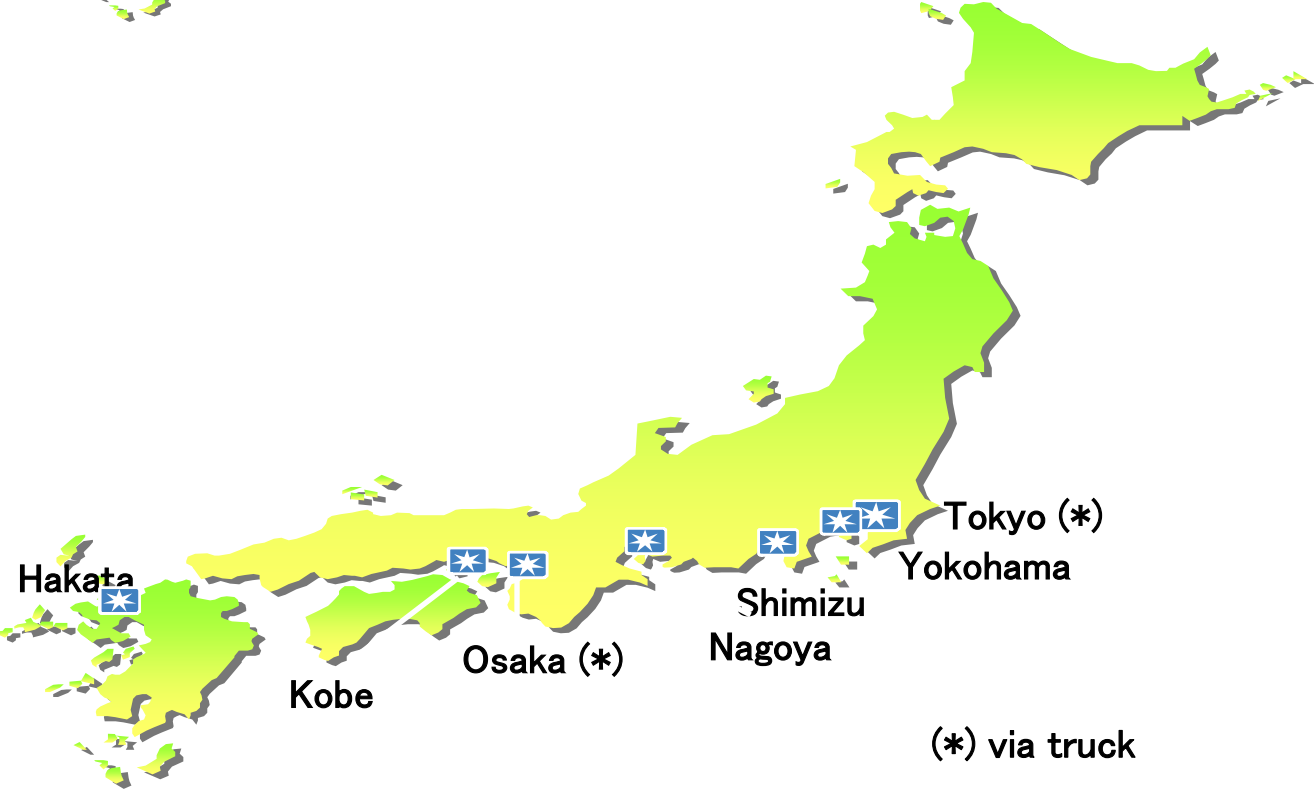
- Maersk expert from regional REFOPS will attend 1st stuffing for new customers, subsequent stuffings must be attended by local Maersk staff.
- Temperature of fish requested shipped at -60°C, must be pre-cooled to min - 55°C.
- If temperature of fish measured at time stuffing is finished if hotter than -40°C, a freezing fee will be charged.
- Sorting during stuffing operation not allowed as this prolong stuffing time.
- Stuffing to be done in max 2-3 hours.
- Stuffing must be done using a stuffie containers with genset.
- Super freezer must be connected to power immediately after stuffing completed.

Ports of Discharge

Tramper



Super Freezer



Documents:

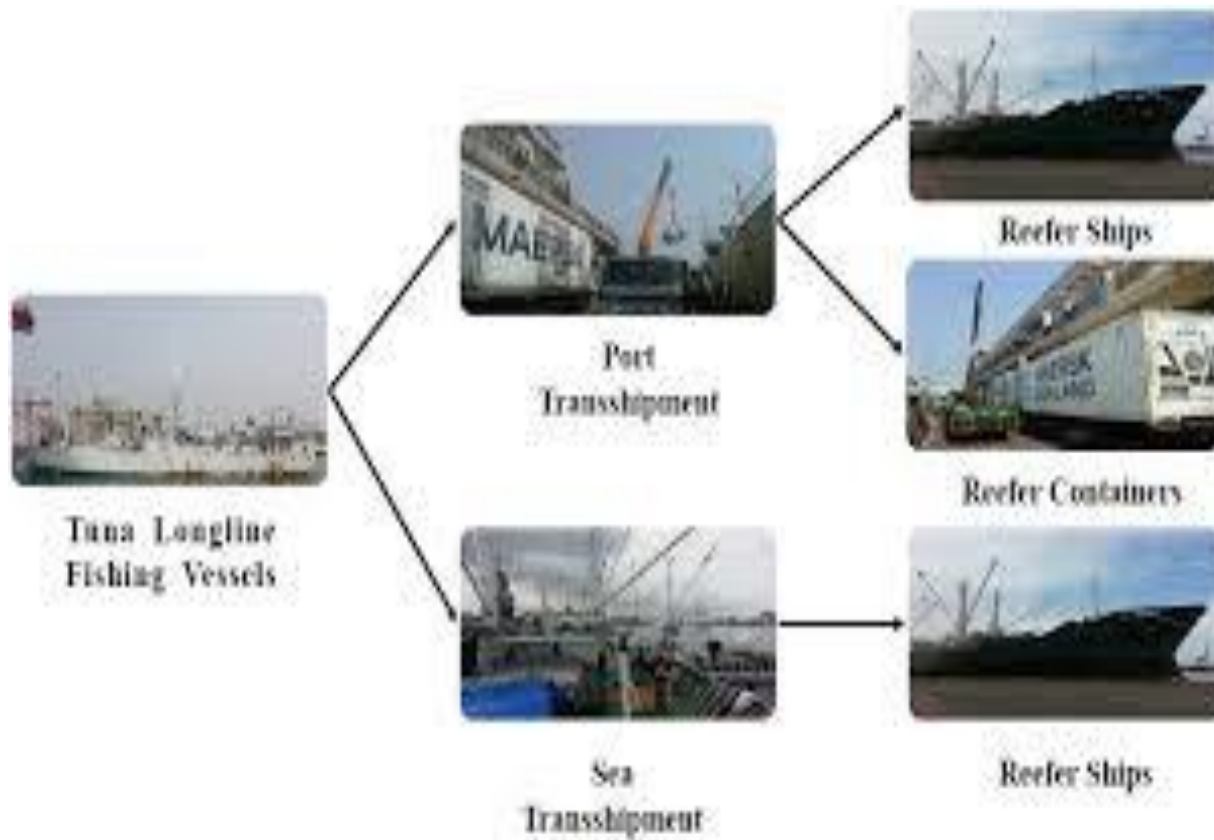
1. Stuffing report.
2. Monitoring/reporting on vessels.
3. Equipment positioning & PTI report
4. RKDS 02 / 05 code “RF” and “SF”.
5. Super Freezer Booking System.

BULK STUFFING



Bulk stuffing - used for frozen tuna.

Cold Supply Chain of Long line Fishing Tuna





Q & A



**THANK
YOU!**

A 3D rendered white character with a round head and simple body stands to the left of the text. The character is leaning its right arm against the vertical stem of the letter 'T'. The text 'THANK YOU!' is rendered in a large, bold, red, sans-serif font with a slight 3D effect and a dark shadow underneath. The background is plain white.