Workflow: Logistics

Toolkit 5.7
Cold Chain and Shipping at Required Temperatures

target audience

Packhouse managers, and logistics managers.

what it is

The cold chain refers to the process of maintaining a required cold temperature of the packed and loaded fruit as required by various markets. More recently, some markets, notably the EU, have introduced mandatory cold treatment of fruit that is being shipped. This module deals with preparing for and maintaining the cold chain and the cold treatment shipping requirements.

why it is important

Firstly, leaving the latest cold treatment regulations aside, fresh produce must be transported under controlled temperature and humidity conditions to maintain quality and increase shelf-life. This is particularly important when exporting fruit because the time in transit is significant.

Secondly, recently some markets are demanding the cold treatment of fruit, e.g., shipping fruit at a given temperature, e.g., 2°C for a specified time period.

If the cold chain is broken, fruit quality is compromised. In the latter case, if the temperature deviates from the range specified, the fruit may be rejected by the receiving market.

Having the infrastructure, equipment, and ability to comply with cold chain requirements is important for several reasons:

- Maintaining fruit quality and shelf-life.
- Maintaining competitiveness and access to premium markets which may also pay premium prices.
- The process is costly, and non-compliance which leads to re-work, and at worst rejection and wastage, is very costly.

success factors

Although the whole cold chain system is important, including the necessary port infrastructure, modern equipment, land-based transport and shipping infrastructure and trucks, trains and ships etc., the success factors below relate mainly to the practices the packhouse should comply with or, at the very least, control if they outsource some of the activities to logistics service providers.

- **Planning and forecasting** – As with all the logistics processes, planning and forecasting as derived from the demand, marketing and operations, and supply plans, are a key success factor. Forecasting the container numbers required is mission critical. Containers, especially relatively new containers that are in good condition, are in high demand with a lead time of about 6 weeks from the time of ordering them. Furthermore, the accuracy of the forecast that matches the actual containers ordered and used is also important because the container suppliers, being under pressure to meet demand, will base their forecast on your actual use, i.e., if you have consistently forecast more than you actually end up using (say 10% less), you may find that the container supplier bases their forecast on 90% of your forecast.
- **Compliance to regulatory procedure** – Compliance to the pre-work required by farmers to register with DALRRD and all the other requirements, starting in October prior to the next harvest and running through to about February is an important, mandatory requirement and success factor.
- **Packing practices** – Packing and palletising correctly and installing the temperature probes correctly is an important success factor. See Toolkit 4.8 – Packing Practices. It is critical to allow proper airflow as intended by the carton design and palletising method, and that this can be maintained throughout the shipping period while the fruit is being cooled. AVOID the wrapping of fruit, especially if the wrapping is applied incorrectly with the branding on the wrapping showing at the top of the fruit and the hole of the wrapping at the bottom; this increases the risk of trapping air in the wrapping and the wrapping then dislodging and blocking airflow through the pallet, leading to a much higher risk of a rejected pallet. If you do insist on wrapping fruit, due to clients' insistence or branding reasons, ensure that hole of the wrapper is at the top of the fruit. The CGA discourages wrapping as the risks to quality far outweigh the marketing benefits the practice may bring.
- **Loading at the right time** – Timing the loading of containers prior to stack is another mission critical moment. Aim to load more than, but as close to, 3 days before stack, i.e., DO NOT aim to load after 3 days before stack. The reason for this is that you need to give yourself time to correct an incorrect load. The PPECB checks that the 3 temperature probes are functioning and stable; if they are not, you need to repack and load, which is the lowest cost corrective action. If you do not have enough time to do this and ship anyway you will compromise the successful shipping of a temperature-controlled load and increase the risk of rejected product at your loss. History shows that many of the instances of rejected loads amount effectively to "self-inflicted injuries", often by the same citrus producers, due to managing the loading process and timing poorly, and not allowing time for corrective action prior to stack. Packing early enough to allow for a safety margin may increase your storage cost, but this does not compare to the potential losses you may suffer for poor practice.
- **All parties present and committed** – The loading of the containers is a critical moment of truth, and the utmost care and rigour needs to be applied in managing that process. The key success factors of this process include:
  - The key parties are present – a representative of the shipping company, the owner of the fruit, and the PPECB is present, observing, assuring compliance, and documenting with a near forensic obsessiveness. Although it is a challenge to have representatives present, but

a number of parties, including some shipping companies, do this a matter of standard procedure which demonstrates that best practice is possible.

- Documentation and record keeping – A commitment and focus to administrative excellence by all parties.

➢ **Confirmation by shipping representative prior to loading onto the ship** – Ensure that the shipping representative has a data link at the depot to check that that the temperature probes are working and stable and that this data is loaded onto the system. This step is not onerous, and again allows for reloading and corrective action at lowest cost and risk.

➢ **Equipment** – Insist on equipment less than 5 years old. Container technology is evolving constantly, so it is beneficial to use containers that have relatively new technology. Old containers are more likely to have perished seals and other problems. Securing the best containers is a matter of elbowing your way to the front of the queue, since the most prepared, insistent, and energetic procurement efforts will be rewarded.

Secondly, ensure that you check the pre-trip inspection date as indicated by the PPECB:

- Normal containers are valid for use 60 days after this inspection date.
- Cold treatment containers are valid 30 days after this inspection date.

➢ **Confirming stable temperature** – If the temperature as indicated by the probes does not settle to within the specified range, do not turn the temperature down in the belief or hope that it will correct and settle and stabilise to within the range later. This is unlikely since the heat generates from the centre the temperature is likely to return to the non-compliant level rather than to within the acceptable range. Rather, correct and reload, which is the lowest cost and risk option.

execution steps

Assuming that your forecasting and planning has been done, the following steps are key:

1. Complying to the export registration requirements with DALRRD for export and cold treatment.
2. Ordering and securing containers well in time and insisting on containers less than 5 years old.
3. Process and quality control of your carton packing process, and fruit wrapping process.
4. Managing the loading window prior to stack meticulously and allowing for enough time to correct loads prior to stack where temperature monitoring and other problems arise.
5. Ensure that the necessary parties are present during the load.
6. Ensure that the shipping representative successfully links the data of the load onto the system prior to stack.
7. Ensure that your documentation is faultless and complete.
8. Ensure that temperature probes remain stable and within range prior to stack.
9. Take any corrective action required prior to stack, as this is the lowest cost and lowest risk alternative you have.

assessment questions

Please Note: There is no minimum / maximum number of questions you can add.

1.	Are your registrations with DALRRD in October prior to the harvest, and your compliance processes in February with customers (e.g., inspectors from various destination countries) in place?
2.	Does your forecasting and planning match (or has a very lower variance, e.g., <5%) your actual container use.
3.	Do you secure your containers in time and in full?
4.	Are your containers less than 5 years old?
5.	Do you manage the loading window prior to stack in the best way, with adequate leeway to correct loading and temperature problems prior to stack?
6.	Do you have representatives of the key parties on site during loading?
7.	Is your documentation comprehensive, faultless, and complete?
8.	Do you confirm, in situations and while your representative is present, that the shipping representative links to the system and loads the data of the load prior to stack?
9.	Do you take the necessary corrective action prior to stack, however inconvenient this may be, to reduce the risk of damage during shipping due to non-compliant cooling or other factors and the resultant increase in rejections of the load?

resources

1.	Ambient / Warm loading of citrus - 2021 Season (CRI - Cutting Edge 320/2021)
2.	Complaints and losses as a result of packaging (CRI - Cutting Edge 297/2020)
3.	Citrus Packhouse Module 9 – Logistics (Citrus Academy)
4.	Citrus Packhouse – Logistics (Citrus Academy)