

Reefer claims loss prevention

A loss prevention America Focus publication

Phase 3a – Pre-Cooling Containers

After issuing Phase 3 “Loading of Refrigerated Containers” the question was raised whether or not pre-cooling of refrigerated containers is a safe and accepted practice.

As any postharvest scientist will strongly indicate that “Temperature Management is Number One” for all perishable cargoes. It follows that pre-cooling the interior of reefer container to avoid cargo contact with a hot interior surface would be a plus. However, the flip side is that we certainly don't want to “somehow” damage perishable cargo or equipment due to handling practices. In the spirit of the foregoing, the following considerations are offered:

Reefer Container Operation - Reefer containers and trailers should never be running while they are being loaded. This practice can cause problems with icing of the evaporator coil and floors, temperature management and the transfer of unwanted hot or cold ambient air and possible exhaust fumes into cargo space.



Pre-cooling reefer containers and trucks has been used successfully for many decades. The purpose of pre-cooling is to cool the interior surface of the reefer container to the desired carrying temperature. If the interior of the reefer container is hot, the cargo can potentially be temperature abused by contact with hot sidewalls and floors of the containers. For example, packaged ice in broccoli cartons when in contact with hot container interiors can melt and subsequently block the air returning to the reefer unit (the amount of ice remaining in a broccoli carton influences the sales price). The result can be "cooked" broccoli. Moreover, hand stowed frozen cargo subjected to undesirably warm floor and sidewall temperatures can potentially be temperature abused. Clearly, pre-cooling the reefer container (with the doors closed) can certainly help suppress temperature-induced damage to the perishable cargoes from hot floors and sidewalls.

However, loading reefer containers in a hot humid and open environment is a poor post harvest handling practice that unfortunately exists with selected shippers and in some locations. Refrigerated loading docks with cold tunnels are recommended. In many but certainly not all loading facilities, cold tunnels are situated tightly duct between the climate controlled loading dock and the container. The cold tunnels prevent outside ambient air from entering the refrigerated dock and the interior of pre-cooled containers.

When perishable cargo is loaded in a hot humid ambient environment, moist air can enter the interior of the pre-cooled container when the doors are opened. Using this scenario, the possibility exists that moisture can condense (dew point condition) on the interior surfaces of the pre-cooled container. Under hot humid conditions, we have typically noted condensation at the rear of the pre-cooled container/on the ceiling. The concern is that moisture on the ceiling might fall on the cartons. In open conditions with hot humid air, we also have witnessed condensation forming on the exposed cartons ("cargo sweat") when the supplier moves the refrigerated cargo from the cold room to a hot, humid dock or open space. Under hot, humid conditions, the problem of cargo sweat (moisture on the cartons) will likely persist even if the reefer container is not pre-cooled.

Defrosts - Inadequately pre-cooled cargo, using excessive fresh air exchange settings and hot humid air favours moisture accumulation on the refrigeration unit's evaporator coils once the doors are closed and the reefer unit is turned on. A significant source of moisture is released from the produce, especially if it is not pre-cooled to the desired carrying temperature. The evaporator coil removes the field/respiratory heat and moisture produced from the cargo as well as the moisture from hot humid air. Informatively, a typical load of produce stowed in a 40' reefer container can contain roughly 35,000 lbs. of water (the moisture content of produce varies from 80 to 96%).

There have been reports of reefer containers imploding due to pre-cooling of the containers. This has been known to happen on super reefers which are specifically designed to maintain temperatures as low as -65C/-76F. A simple vacuum relief check valve added to the reefer and the cleaning of evaporator drain lines and/or floor drains would prevent containers imploding.

We trust the above information will clarify any issues that were raised in Phase 3, but if any issues still remain, kindly contact any of the below contributors for assistance.

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