

Cold wall

This is a permanently constructed air plenum equipped with an exhaust fan. It is often located at one end or side of a cold room, with the exhaust fan designed to move air over the cooling surface. Openings are located along the room side of the plenum against which stacks on pallet loads of containers can be placed. Various damper designs have been developed so that air flow is blocked except when a pallet is in place. Each pallet will start cooling as soon as it is in place; thus, there is no need to await deliveries to complete a tunnel. Shelves are often built so that multilayers of pallets can be cooled with this system. Different packages, and even partial pallets, can be accommodated by proper design of the damper system. This is a benefit in some operations where a range of commodities or varieties is handled. Each pallet must be promptly moved from the cooler as soon as it is cooled in order to avoid unnecessary desiccation from continued rapid air flow over the product.

The usual design air-flow rate for strawberry cooling is $2.1 \times 10^{-3} \text{ m}^3/\text{s per kg}$ ($2 \text{ ft}^3/\text{min per lb}$) of fruit with the air temperature at 1.7°C (35°F) [5]. The cooling time varies from 1.5 to 2.5 hours depending on initial temperature of the fruit. In practice, air-flow rate generally varies from 1.0×10^{-3} to $4.2 \times 10^{-3} \text{ m}^3/\text{s per kg}$ (1 to $4 \text{ ft}^3/\text{min per lb}$) of fruit.

Strawberries are usually precooled at the packinghouse in pallets consisted of 96 open-top fiberboard, single-layer tray cartons (Figure 3) containing eight 1-quart or 12 1-pint containers (Figure 4), weighing approximately 454 kg (1,000 pounds). The pallet is usually three cartons deep, two cartons wide, and 16 high. Most boxes are constructed in such a manner that tray cartons are connected together with wires and each carton is connected to the carton below with tabs protruding up into the carton above for load stability (Figure 5). The cartons have enough open area to allow for passage of cooling air (Figure 6). Cold air is forced through the pallet and recycled through a refrigeration unit.

Container venting

Effective container venting is essential for forced-air cooling to work efficiently. Cold air must be able to pass through all parts of a container. For this to happen, container vents must remain open after stacking. Thus, venting patterns are important. Too little venting will restrict air flow; too much venting will weaken the container.

The standard strawberry carton has a vent hole that looks like a channel with sloping sides cut in the upper fourth of two opposite sides of the carton

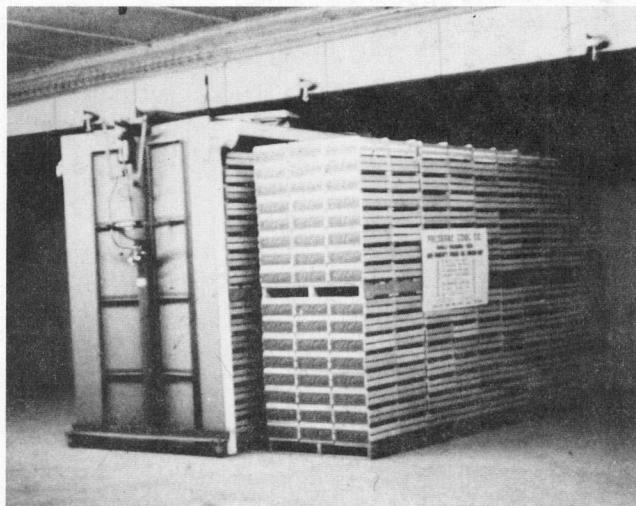


Figure 3. Forced-air cooling pallet loaded with tray cartons of strawberries.



Figure 4. Pint container in tray carton.



Figure 5. Wire tabs for connecting tray cartons.