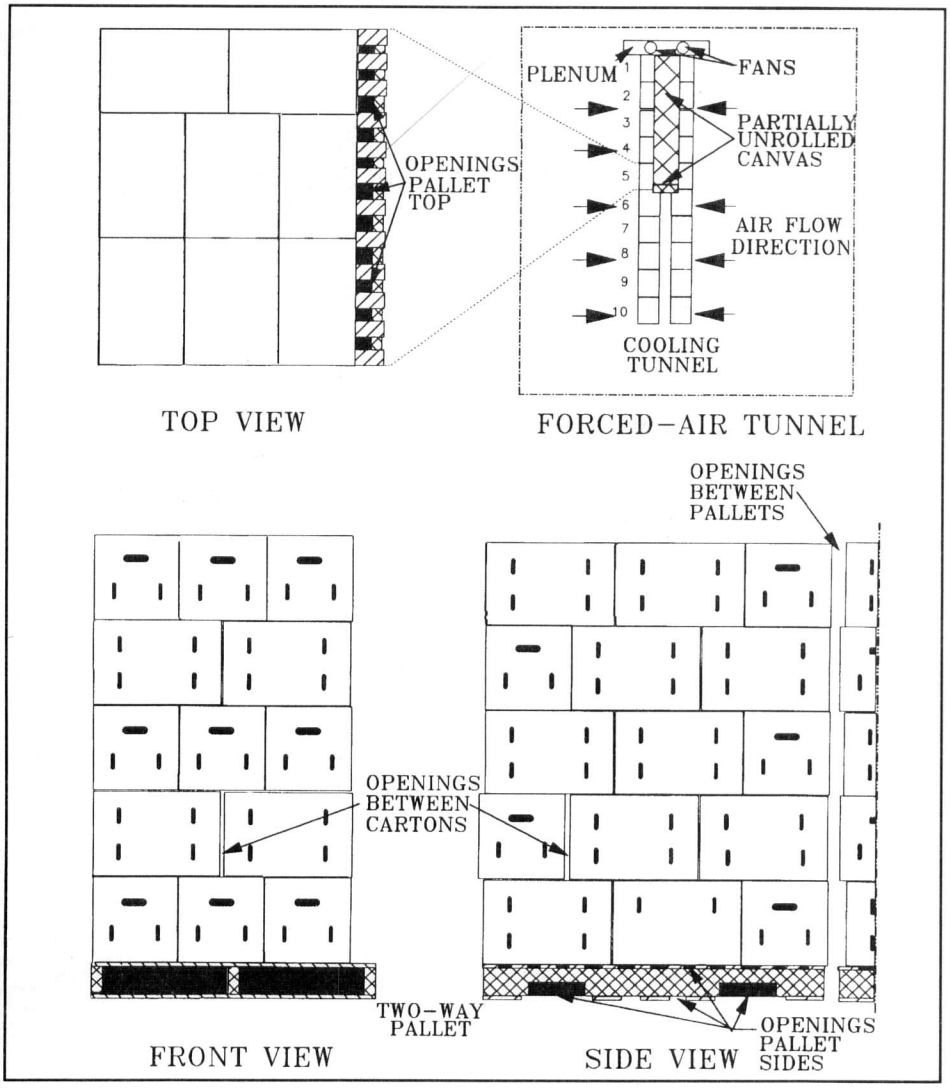

Figure 3. Container and pallet stacking configuration for forced-air cooling tunnel.

This publication discusses methods to evaluate and improve forced-air cooler performance. It is intended to assist those interested in improving the performance of an existing forced-air cooler as well as those planning to install new forced-air cooling systems. The information is applicable to all types of forced-air cooling systems.

System performance can be assessed by measurement of static-pressure drop, air velocity or flow, and cooling rate during commercial forced-air cooling. Precoolers can be made more efficient by several minimal cost methods and by increased management. These methods include sealing air-leak areas to force additional air through products, improving carton stacking configurations or orientation, modifying pallet-tunnel length and width, and proper temperature monitoring. Methods requiring more time and cost include improvement in carton design, increased fan and cooling capacity.

Seal leaks

The path of least resistance is a key physical principle when considering forced-air cooling. Air, like water, flows from a point of high pressure to a point of lower pressure by the path which presents the least resistance. The goal for effective forced-air cooling is to insure that the path of least resistance is through the product rather than around the container.

Air bypasses or short circuits whenever the path of least resistance is not through the product. Such bypasses include openings between stacked containers on pallets (Figures 3, 4, and 5), between adjacent pallets, side pallet entry holes under pallets, loosely installed canvas covers or through holes in the canvas, and at the junction between pallets and air plenums or ducts.

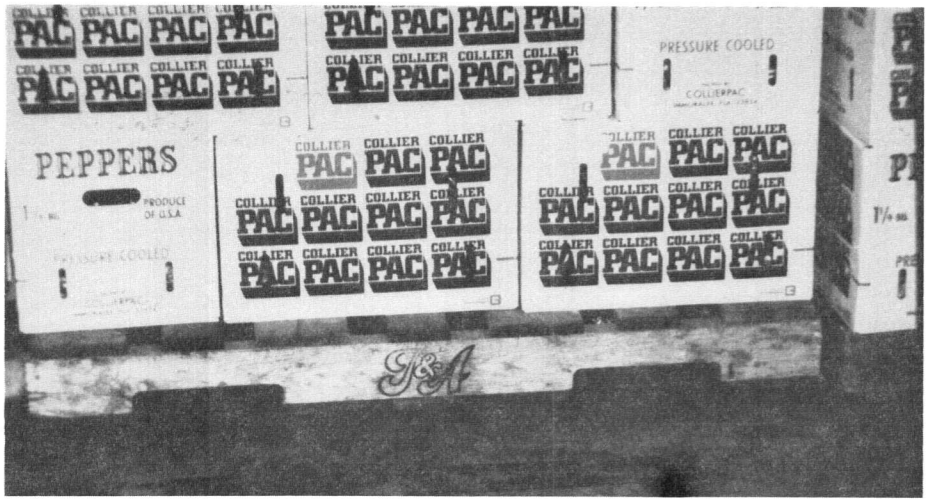

Figure 4. Opening in pallets sides and tops and gaps between adjacent pallets provide paths for cooling air bypass.