

Global Cooling

Precooling, Postharvest, & Ripening Systems
The Forced-Air Cooling Experts™



Preserving
Freshness

Part 6 in a Series of Informative Articles about Forced-Air Precooling

We are pleased to present an article by Jim Thompson, who has been an adviser to our company for a number of years, and a great help to us. (To contact Jim, eMail to jamfthompson@gmail.com, or see UC Davis page [here](#).)

The Return on Investment of Forced-Air Precooling

by Jim Thompson and Jim Still, March 31, 2014

Reducing the time between harvest and when perishables cool to storage temperature has a number of advantages for growers, shippers, and cold storage operators. Installing a forced-air precooler reduces the time needed for product to reach recommended storage temperature, and also can increase the product throughput of a cold storage (without increasing the size of the facility). For example, using only room cooling, a pallet of packed boxes requires a minimum of 24 hours, and most often several days, to cool to the storage room's temperature. A properly designed and operated forced-air precooler will usually bring the product to near the cold room temperature within 3 to 6 hours. This faster cooling can easily double the amount of product handled per day in a refrigerated facility.

Forced-air cooling also ensures the product reaches its recommended storage temperature, and preserves shelf life and salable weight. To explain, perishables lose water through transpiration and both water and carbon dioxide through respiration. Both processes contribute to weight loss, and loss of shelf-life and appearance. The rate of losses is higher when produce is stored at warmer temperatures. For example, delaying initial cooling of grapes for 6 hours, instead of cooling within one hour after harvest, will cause an extra 2% weight loss. Optimized cut-to-cool times have been proven time and again to reduce weight loss by at least 1% for many operations.

To make this example personal, assume the added value of improved temperature management is equal to 2% of your annual sales. To calculate your return on investment, divide the increased sales by the amortized cost of installing and operating the forced-air precooler. It is not unusual

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for a relatively small investment in a top-quality forced-air precooler to pay for itself in less than one season, and to keep on generating additional profits for the entire life of the equipment. A good quality precooler can be a lot like a goose that lays golden eggs year after year!

Improved cooling may also allow you to ship product to more distant locations. For example, a strawberry shipper in California could not market berries farther than the Mississippi River using his old system that could not cool fruit below 38°F. After installing improved precooling equipment, he could cool berries to 33-34°F and could effectively reach customers throughout the US. It is difficult to estimate the value of a broadened customer base, but it holds the potential of selling at higher prices and ensuring there will always be a market for all of your produce.

Doing a better job of cold chain management can open additional local markets for you too. For example your produce can be dependably cooler than the maximum allowable arrival temperature that local marketers require. They will shift their purchasing to a supplier who consistently meets their quality standards.

For small-scale growers who market through farmer's markets, improved temperature management offers the possibility of storing produce until it can be marketed without having to reduce prices. An organic fruit grower in Northern California installed a cold room and was able to buy excess fruit from his neighbors during a warm spell that sped harvest. He was able to store the fruit for several weeks until the supply dwindled and he was able to market his fruit and the fruit he bought it at a good price. He figured the extra profit he made paid for the cold storage in one season. So, his ROI was 100% annualized, and with proper management and some good fortune, that one-time investment might continue to generate that same return for the next 20 years, for a total ROI of 2000%.

Cold storage operators (3PLs) too, can offer rapid cooling as a service to their customers. In this situation forced-air precooling becomes a profit center for them, as well as a benefit to the grower/packer/shipper. A common cooling charge is \$0.50 to \$1.00 per box of produce. A storage operator who offers a cooling service can pay for the cost of installing a forced-air precooling system in an existing cold room in several months of operation. If the precooler is portable, it can then be moved out of the way and into a storage slot, freeing up that floor space for other operations, until the precooler is needed again.

Each operation has a different set of circumstances, but nearly every one finds that faster cooling after harvest and the ability to store and transport more produce at its recommended temperature increases profits and brand name equity.

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A last note to address the question “if I only add the forced air tunnel, and no extra cooling coils or compressors, how can I be sure I have enough cooling capacity to do precooling too?” Many facilities have adequate capacity for some forced-air cooling, but to be sure, ask your refrigeration service company, or your forced-air precooling supplier, for their advice about the capacity of your facility.

END OF THIS ARTICLE.

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