# RECOMMEND PRE-COOLING TECHNOLOGIES

One of the most important lessons we learned very early on in our close to 20 years of marketing Xtend MA/MH packaging is the importance of good temperature management.

Whether you are packing with Xtend® MA/MH packaging or not, strict temperature management is undoubtedly the single most important factor for slowing down the aging of fruits and vegetables and ensuring that they reach their final destination as fresh as possible. This means developing and implementing protocols that are realistic and maintainable over time. Some practices are simple to execute, requiring no more than a training session with employees. Other measures may take longer to establish and require investment in time and money.

Over the years, our field teams have gained a wealth of experience in all aspects of post-harvest cooling practices and regularly aid customers in implementing them. Here's a summary of what we've learned.

**In the field**

Temperature management begins in the field during harvest. The instant a fruit/vegetable's umbilical cord is cut, nutrients are no longer replenished and senescence (aging) begins. Here are some tips to slow this temperature dependent process as much as possible.

- Harvest during the coolest part of the day
- After harvesting, protect the crop from direct sunlight.
- Use light colored crates
- Place crates in shaded areas in the field until transport to packing house (small temporary or movable shacks can be constructed)
- Sprinkle potable water over the produce (for selected produce types)
- Make frequent trips to the packing house
- Use covered trucks for transport from field to packing house
- Begin pre-cooling as soon as produce arrives at packing house (unless packing is done in an ambient temperature room)


**Pre-cooling**

Pre-cooling to remove field heat should be done as quickly as possible after harvest. There are several methods for effective pre-cooling depending on fruit/vegetable type:

- Room cooling
- Forced air cooling
- Hydro-cooling
- Vacuum cooling

**Room Cooling and Forced Air Cooling**

There are several simple steps that can be taken to increase effectiveness of room cooling and forced air cooling:

- Use well ventilated crates
- Align crates so that air flows all the way through the pallet
- Stack crates so that air can circulate around them (room cooling)
- Provide adequate ventilation so that air flows freely in the room
- Ensure that the room's set point temperature is appropriate for the produce being cooled
- Use humidifiers to reduce dehydration of naked produce during cooling and storage
- During forced air cooling, particular attention should be given to maximizing air flow through the produce by completely blocking all other routes through which the air can pass. For this purpose, make sure that the tarp is properly attached and that foam is used to block the base of the pallets.

**Hydro-cooling**

Hydro-cooling is a highly effective means of rapidly reducing the temperature of produce such as asparagus and cherries. When either shower or flume hydro-cooling is implemented, make sure that there is adequate water flow over the produce at all times. Some important tips to remember are:

- Disinfect the water
- Closely monitor pH, chlorine and temperature
- Change water frequently or filter if it is re-circulated

In order to maintain cooled temperature of produce, it is crucial to return it to the cold storage area immediately.

**In the packing area**

It is vital to keep temperature fluctuations to a minimum throughout the supply chain and ideally the temperature of produce should only decrease or remain constant after harvest. The packing area is no exception. If produce has been pre-cooled, the temperature of the packing area should be kept as near to the recommended storage temperature as packers can tolerate. In addition, residence time of produce in the packing area should be kept to a minimum.

If produce temperature rises significantly during packing in Xtend®, it should be force air cooled as quickly as possible.

**In the storage area**

Produce arriving from the field requires a different cooling regime than produce that has already been cooled and packaged. Therefore just harvested produce should be stored in a separate room from produce that has been pre-cooled and packed.

**On the loading dock**

Temperature management continues as palleted produce is loaded onto trucks for transport. Four easy to implement practices can ensure that produce temperature remains within its specified range.

- Surround loading ports with insulating foam so that truck/container interior is not exposed to external air.
- If loading from a cold corridor doc, pre-cool truck/container to set point temperature before loading pallets.
- Make sure that after pre-cooling, warmer external air does not enter, which will result in the formation of condensation on the truck/container walls and ceiling.
- Load from a cold corridor dock.

Many of the best cooling practices mentioned in this article are self evident and well known to professionals in the industry. But reviewing them and their importance with veteran and newly recruited employees should be repeated frequently so that implementation is constant.

Good temperature management is critical for optimal performance of Xtend® bags, which are precisely engineered to maintain optimal conditions for the specific fruit/vegetable inside the bag when stored within the recommended temperature range. Our field support teams, stationed throughout the world, are available to assist customers with recommendations and implementation of our best cooling practices as well as other post-harvest handling and logistics issues.

For detailed, best cooling practices contact us at **info@stepac.com**