

“Carolina Cooler™” evaporative cooling system



Design Criteria:

1. Evaporative cooling system using six inch thick cooling media to reduce square footage of wall space required while maintaining or increasing cooling effectiveness.
2. Cooling system components to be made of materials that will require minimum maintenance and provide, as much as possible, an unlimited production lifespan.

These materials should be able to withstand exposure to UV rays for an indefinite period.

No painting or other “add-on” maintenance should be required.

3. Maintenance should be limited to cooling media replacement, water system cleaning and pump repair and service.
4. Should be able to be installed easily in a wide variety of greenhouse brands and sizes.

Design Specifications:

1. Six inch Glacier-Cor cooling media uses 33% less wall space for same cooling value.
2. All components except plumbing components (pipe, gate valve, Y strainer & pump) are aluminum extrusions with a potentially unlimited production lifespan.

Plumbing is PVC pipe, brass gate valve and polypropylene Y strainer.

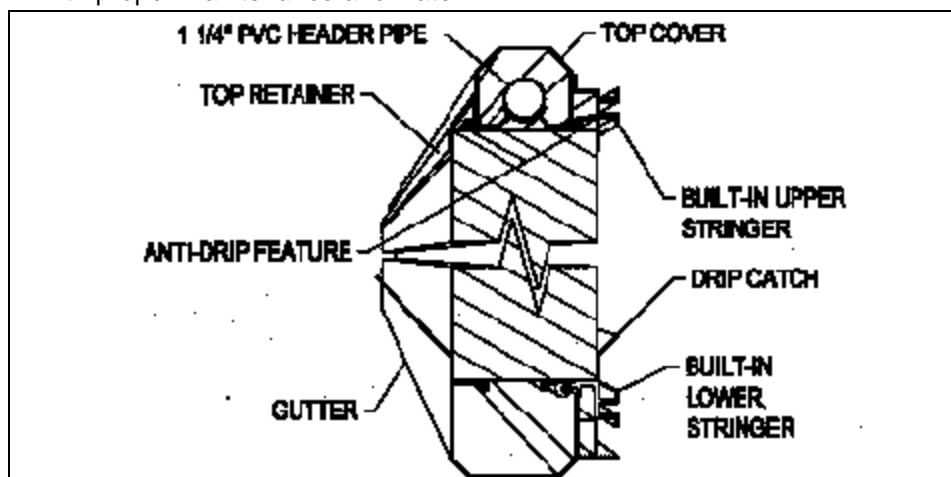
3. Cooling media has a one year warranty. Media should last for years with proper maintenance and water

quality. **Pads must be allowed to dry out completely every day.** If not allowed to dry out each day, lifespan could be reduced by 50%.

See other side of this bulletin for addition system maintenance.

At the beginning of each season, flush header pipe, clean Y strainer, pump and reservoir.

4. Easily assembled to any greenhouse endwall with no additional support needed.



Proper Use of Evaporative Cooling

Evaporative cooling can be one of the most cost effective methods for maintaining a proper growing environment when it is done properly.

Evaporative coolers cool air that moves through the porous, water-soaked cooling media. The speed of air movement through the cooler is of critical importance to its performance as a cooler.

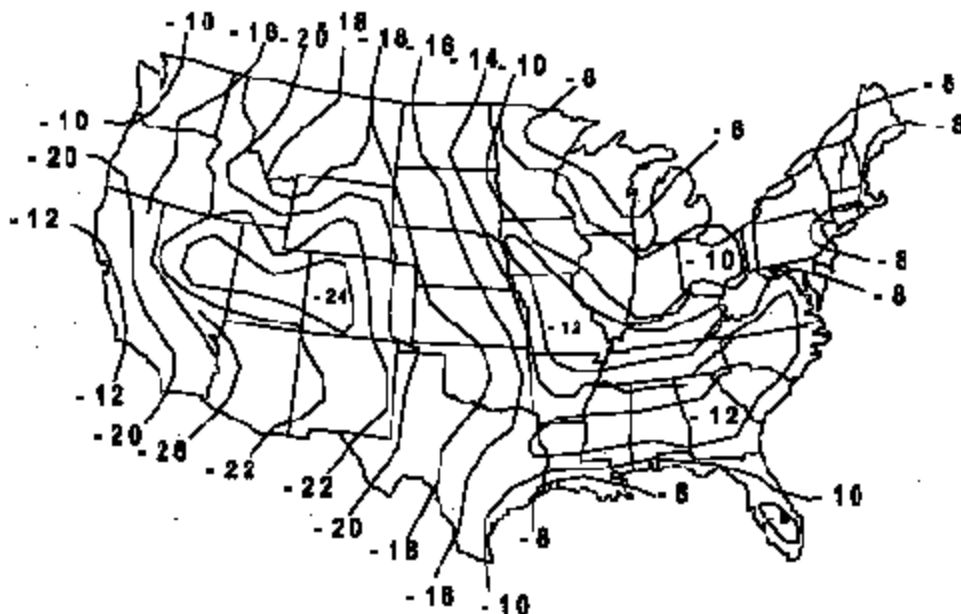
To function effectively, air must pass through an evaporative cooler with a velocity of 375 to 425 feet per minute (4.3-4.8 mph).

Exhaust fans and coolers must be carefully sized to one another and to the size of the greenhouse being cooled if cooling is to work at its best.

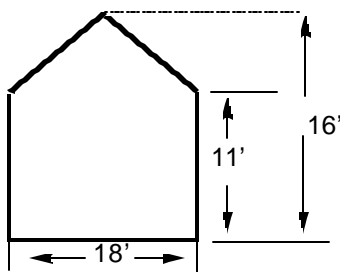
Exhaust fans that are too large for the greenhouse and the cooler will pull air through so rapidly that no air mixing occurs. This creates hot side areas and a cool center.

A cooler that is too large for the exhaust fans will have an air velocity below the required speed. This situation leads to inadequate cooling just a short distance from the cooler.

Approximate air temperature drop across Carolina Cooler (6" media) during July with a properly sized ventilation system.



Proper Sizing:



To properly size your cooling system, you must know the volume of air (cubic feet) within your greenhouse. Determine the area of your endwall.

Find height of gutter and ridge. Multiple each by width. Subtract gutter total from ridge total. Divide remainder by 2. Add this to gutter total for end-wall area in sq. ft.

Example:

Gutter: (w)18 x (H)11 = 198 sq. ft.

Ridge: (W)18 x (H)16 = 288 sq. ft.

$$\begin{array}{r} 288 \\ - 198 \\ \hline 90 \end{array} \qquad \begin{array}{r} 90 \\ \div 2 \\ \hline 45 \end{array}$$

(Gutter) 198 + 45 = 243 sq. ft.

Endwall area is 243 sq. ft.

Multiply this number by the length of the greenhouse to find its cubic foot volume.

To be exact on Quonset roofed structures, call your supplier. Each manufacturer uses a different radius

curve for their bow.

If our greenhouse example is 100 ft. long then the volume of air within is: 100 x 243 = 24,300 Cu. Ft.

Ideally you should have 1.3 air changes per minute in our greenhouse example or 31,590 Cu. Ft. of air exhausted. Although industry standard is one change per minute, our experience has shown that moving air is the only way to cool a greenhouse on peak summer days.

The combined ratings of the exhaust fans should be at least 32,000 CFM (Cu. Ft. per Min.).

To find out how many square feet of cooler we need to get the right air velocity over the pad (375-425 ft. per minute), you divide the fan exhaust volume by the air velocity desired.

$$\frac{32,000}{400} = 80 \text{ sq. ft.}$$

Thus, with an 18 ft. wide endwall, you could use a 5' x 16' cooler, or, if a doorway was needed, a 6' x 13' cooler to achieve the needed velocity. Pad heights are in one foot increments from 2 ft. to 6 ft.

Typical Maintenance Requirements

Cooling pads are made of a corrugated cellulose material. The manufacturing process leaves dust and debris in the pad that washes out into the system during the first weeks of operation. The Y strainer catches this debris. It must be cleaned daily until the pads stop releasing debris or your cooler will run hot and cut-off.

Pads

To prevent algae build-up on pads, maintain a Ph of 5.5 to 8.5 in your reservoir. Add algicide to reservoir to eliminate existing algae growth.

Bugs and airborne trash should be removed from cooling pads at the beginning of each season. A household broom has the correct stiffness.