

Thermal Curtains

In a greenhouse, 70% to 80% of the heating occurs during night hours. A substantial reduction in energy use can be realized with the use of thermal curtains and some growers have reduced heating bills by up to 50%.

A thermal curtain is a fabric sheet and support system that is pulled across the roof area (sometimes walls) of a greenhouse during night time hours in cold weather to reduce heat loss. Curtains work by reducing the volume of the heated space in a greenhouse and provide an additional thermal boundary. High efficiency thermal curtain materials are designed to reflect the infrared radiation emitted by the greenhouse structure, plants and benches back into the greenhouse. Some curtains can also double as shade cloth in the summer to reduce ventilation and cooling requirements by reflecting un-needed light (heat) out of the greenhouse. There are a variety of curtain materials available to meet different crop needs with night time heat loss reductions ranging from 20% to 70% and summer shading from 15% to 99.9% (blackout).

Curtain Materials - There are many types of screen materials on the market but the type that offers the best alternative for both heat retention and shading are semi-porous films made of alternating strips of clear and aluminized polyester or acrylic fabric. The aluminized strips reflect un-needed light out of the greenhouse during summer and reflect heat back into the greenhouse at night during cold weather. Flame resistant fabrics are recommended and may be required by state or local fire codes. Check with your building inspector to determine local code requirements. Porous fabrics with gaps or open weaves for air circulation have some value for heat retention (about 20%) but are principally used only for shading.

Installation - Curtain systems can be installed in almost any greenhouse but some modifications may be required. If plants, lights, heat pipes, air ducts or irrigation lines are hanging from the roof structure, they may need to be moved or supported from the ground before curtains can be installed. Manufacturers of thermal curtains have developed curtain system designs that avoid the need to move some of the items supported by the roof structure. A thermal curtain system can be opened and closed by hand or can be fully automated to open and close based on temperature, solar radiation and /or time of day. All edges of the curtains need to be sealed when closed to prevent a chimney effect where warm air rises above the curtain and displaces cold air. Such an effect can cause localized crop damage as the cold air falls to the floor.

The National Greenhouse Manufacturers Association publication, "Considerations for Internal and External Greenhouse Curtain Systems" (www.ngma.com/standardpdf/curtainssystems.pdf), goes into more depth about the different system configurations for curtain systems. When installed and used correctly, thermal/shade screens can improve plant growth and reduce both heating and cooling costs with paybacks of 3 to 5 years for an average greenhouse.