

Heat Loss

- **IR and Anti-Condensation Treated Films**

A double polyethylene covered greenhouse reduces infiltration losses but will allow infrared radiation to transmit out of the greenhouse unless it's using an IR treated film on the inside can reduce infrared radiation loss. Condensation on the inside of a poly covered greenhouse can reduce thermal radiation loss by up to 50%, however condensation also reduces light levels at the plant and the amount of solar radiation entering the greenhouse. Dripping condensation can also lead to plant quality issues so it is important to keep greenhouse covers free of condensation. Most polyethylene films that are treated to reduce IR losses are also treated with an anti-condensate on one side to reduce condensation from collecting. The IR / anti-condensation treated films cost about \$0.015 per square foot more than untreated films but reduce energy use by 15 to 20%. In Wisconsin, the payback on the incremental cost for purchasing IR / anti-condensation treated films should only be less than one heating season.

- **Insulated Side Walls**

Greenhouses that use bench systems can insulate the side walls, end walls and perimeter with 1" or 2" foam insulation board. Insulation should be dug in 12" to 24" (preferred) deep and can be extend up to the plant height. The foam should have a protective cover such as aluminum foil to protect the foam from UV deterioration and to reduce fire hazards. Spray-on foams on framed walls also provides excellent insulation but also needs to be protected. If foam is placed on the inside of the greenhouse, a reflective coating towards the inside will reflect direct solar radiation back to the crop canopy aiding in plant growth. Two inches of foam insulation around the knee wall of a 28-foot by 100-foot greenhouse will save about 400 gallons of fuel oil, 610 gallons of propane or 558 Therms of natural gas per year.

- **Night Curtains**

Research indicates that 80% of the energy to heat a single-glazed greenhouse is required at night so reducing heat loss at night can pay dividends. A movable insulated curtain can reduce the heat loss by 20 to 70% when the curtain is closed. There are several types of blanket materials available with different advantages and disadvantages. Porous blankets save about 20% when closed but can be used for shading in the summer and allow water to drain through it. Non-porous aluminized materials provide the most savings; up to 70% when closed. Installation costs (\$2001) can range from about \$1.10 to \$3.35 per square foot depending on the size of greenhouse, blanket material and type of track / drive system used.

If you have questions about the information on this site, please contact
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