

Energy conservation—heating systems

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Keeping the greenhouse heating system in good repair and operating condition can save money in several ways. Fuel consumed may be reduced as much as 10 to 20 percent. Heat distribution may be more uniform resulting in a lower thermostat setting and better plant growth. The system is less likely to fail causing crop losses.

A competent serviceman should clean and adjust all furnaces and heaters at least once a year, preferably in the fall before the winter heating season begins. The following checklist reviews the most important factors that should be considered:

Use the proper fuel—the use of the wrong grade or type of fuel can result in carbon accumulations, decreasing heat transfer.

Protect fuel oil tanks—twenty percent of service calls result from dirty fuel. Tanks should be away from dusty locations and watertight fittings should be used.

Remove soot from inside the furnace—a 1/8-inch soot deposit can increase fuel consumption as much as ten percent. Surfaces should be wirebrushed and vacuumed or special cleaning compounds used.

Change fuel filters—uniformly-clean fuel delivered to the burner results in more efficient combustion. Fuel supply line connections should be tight.

Use correct nozzle size and angle—excessive fuel consumption will result from too large or too small a nozzle. The spray angle should fit the shape of the fire box.

Clean and adjust controls—check gas valves, thermostats, and ignition mechanisms for clean, smooth operation.

Oil bearings on motors and pumps—periodic lubrication of bearings increases their life.

Use clean water—drain off dirty water through drain cocks in steam and hot water systems. Flush steam boilers to remove scale and lime deposits.

Check combustion efficiency—the lower the stack temperature, the lower the oil consumption, while the higher the carbon dioxide content of the stack gases, the more completely the oil is being burned.

Replace burned oxygen—in poly houses and tight glass and fiberglass houses, install an air intake from outside to near the heater. Allow 1 square inch of intake area for each 2000 BTU furnace capacity.

Chimney must be high enough—should extend at least 2 feet above the ridge of the greenhouse. Top of chimney should be at least 8 to 12 feet above the furnace to develop sufficient draft. Use cap if necessary to prevent back drafts and possible air pollution injury to plants.

Chimney must be tight—any air leaks will chill the gases and reduce the draft.

Chimney must be correct size—too small a cross section or chimney lined with soot will reduce the draft. Too large a diameter will cool the gases too quickly.

Draft control is necessary—draft variations due to atmospheric conditions can be stabilized by installation of a draft regulator.

Install baffles—turbulators or baffles installed in boiler tubes slow and direct the flow of gases so that more heat can be absorbed. Ten to 15 percent savings in fuel consumption can be realized.

Blower timing—in forced warm air systems, blowers should operate until the furnace is cooled to 100 to 120 degrees F or continuously where desired.

Radiator valves are vital to fuel savings—repack leaky valves and replace defective ones.

Clean radiators and pipes—dust and dirt reduce heat transfer and increase fuel consumption.

Insulate distribution lines—in unheated areas and underground, insulate pipes to reduce heat loss.

Thermostat replacement—locate thermostats at plant height away from heat pipes and hot air streams. Shade and aspirate thermostats for most accurate control of temperature.

Furnace and fan thermostat differential—set fan thermostat at least 10 degrees above heater thermostat to prevent simultaneous operation and possible back draft.

Inspection record—keep a record of furnace maintenance and repairs for future reference.

An excellent review of conservation measures and ideas is contained in the recently updated 40-page bulletin *Energy Conservation for Commercial Greenhouses* available for \$4.00 from the Department of Resource Management and Engineering, U-87, 1376 Storrs Road., UConn, Storrs, CT 06269-4087. Make check payable to UConn.