

Hot Water Heat: Save Money, Cut Disease

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What is hydronic heating and how could it benefit your operation? Energy savings of more than 20% is just one reason to evaluate your energy options.

Unreliable fuel prices have everyone searching for ways to cut costs and maximize energy efficiency. Hydronic heating is an affordable option that will heat plants and greenhouses more effectively than conventional systems, allowing growers to save money on energy bills while improving plant health and producing high-quality, uniform crops.

RADIANT HEAT IN ACTION

Hydronic heating is the use of water as a heat transfer medium in heating systems, using a boiler to heat water and a pump to circulate

the hot water in rubber tubes that are either buried underground for field growing, embedded in concrete for radiant floor

heating, or installed in greenhouse bench systems. Separated radiant heat zones are controlled by one thermostat and served by a manifold, which distributes the flow of hot water to the individual circuits of tubing within each zone.

The process works through thermal radiation, which travels in invisible waves through empty space. Radiant heat is absorbed by the objects in its path, rather than in the air. This makes it more effective than forced air heating because it utilizes heat transfer, along with a superior conductor of heat in the form of a liquid, versus forced air, which relies solely on convection and air. The result is a consistent, comfortable temperature that makes the greenhouse feel warmer at lower air temperatures than are required with conventional heating systems.

While forced air systems offer the most system choices in all levels of efficiency, air ducts in these conventional systems are hard to seal. A large proportion of heat is lost before it even reaches its destination. Conversely, hydronic radiant heating uses a closed loop system that loses very little heat while moving heated water to its destination. Requiring very little electricity to run, hydronic heating is ideal for growing operations in areas with high electric fees. ▶▶▶

Top 3 Benefits Of Hydronic Heating

- 1 Heats the greenhouse starting at the plant roots, resulting in faster crop production and healthier plants.
- 2 Saves 20% to 30% in energy bills through more efficient energy use.
- 3 Allows flexibility in boiler fuel choices, and the ability to supplement with renewable resources like solar and geothermal heaters.

COMPARING SYSTEMS

While hydronic heating systems do cost more up front than traditional, forced air systems, the long-term energy savings from more efficient heating will pay back the added expense. One advantage of hydronic systems is the flexibility of the fuel source, with options for using gas, oil, electricity, and even solar and geothermal energy.

The foundation of a reliable hydronic heating system is an energy-efficient boiler, like Delta T Solutions' RBI Boilers. These integral, 2-pass heat exchanger and standard bronze headers virtually eliminate standby losses and condensation problems. Ideal for hydronic heating, the RBI line provides options in natural draft and sealed combustion boilers, as well as oil fired and electronic boilers.

Other energy options, including some that can work in tandem with a boiler, are:

■ **Combined hot water and heating system boiler:** Boilers can be used along with hot water heating units, like our Sterling model "HS" horizontal unit heaters, available in serpentine and header designs, both ideal for hot water installations.

■ **Solar water heater:** A solar heater cannot provide enough hot water alone, but it can increase the energy efficiency of the systems and work together with the boiler. Roof panels can heat liquid that runs through tubes inside a water storage tank, providing naturally pre-heated water and requiring less energy from the boiler.

■ **Geothermal heat pump:** Similar to solar heaters, geothermal heat pumps can preheat water by using natural heat found several feet underground. If it's available, geothermal heat can reduce the amount of fuel your boiler uses.



Radiant heat warms the greenhouse starting at the soil level for faster germination and production and less disease.



Radiant floor heat installed in concrete slabs warm crops from the bottom, ideal for producing finished greenhouse vegetables.



These systems heat the water that runs radiant floor, in-ground and bench systems including Delta T Systems' line of products:

- Delta-Tube EPDM small diameter (SD) rubber tube in-ground heating system
- Delta-Tube EPDM large diameter (LD) rubber tube in-ground heating system
- Delta-Tube high-density (HD) poly tube floor heating system
- Delta-FIN TF under-bench heating system
- Delta-FIN SF high-output heating system

WHAT YOU'LL GAIN

At the bench on the greenhouse floor, radiant heating systems offer distinct advantages, including accelerated germination, rooting and plant growth, as well as 20% to 30% fuel savings over conventional forced air heating. Maximum soil and plant temperature control combine with the ability to create different temperature zones for growing flexibility.

In the interest of promoting sustainable energy sources, many government tax incentives are available for grower operations using highly energy efficient heating methods. Even better, millions of dollars in grant money through the U.S. Department of Agriculture's Rural Energy for America Program (REAP) and Environmental Quality Incentives Program (EQIP) initiatives can help growers pay for new systems.

Find out how much heat your greenhouse operation needs on a per greenhouse level by simply downloading Delta T Solutions' heat loss calculator at www.deltatsolutions.com. To perform a cost analysis on a new hydronic heating system compared to your current system, call 800-552-5058 or e-mail sales@deltatsolutions.com to contact a Delta T Solutions consultant. ▲

Payback Picture

- Compare hydronic systems to conventional forced air systems to evaluate the best options for your greenhouse operation.
- Hydronic heating systems cost more up front, but offer 20% to 30% energy savings long term.
- Forced air heating systems offer more options, at all efficiency levels, but heat loss is a common drawback.



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