

Institutional Greenhouse HVAC Expertise

Delta T Solutions Inc. — Specialists in institutional greenhouse HVAC specifications, design, and installation.

▶▶ **20+ years of experience** working with architects and engineers to create customized greenhouse growing environments

▶▶ **Unique knowledge base** of HVAC engineering and biological growing requirements

▶▶ **We manufacture specifically** for the unique greenhouse environment

▶▶ **Single source for institutional greenhouse specifications** meeting local codes and regulations, customized design, and expert installation



Delta T Solutions

Engineering, Integrating, Innovating Systems

Hydronic heating • Chilled water • Irrigation

Creating Controlled Growing Environments

Demanding institutional greenhouse environments require special expertise in the design and operation of efficient and effective HVAC systems. Whether the growing environment requires hydronic heating, chilled water systems, or special-delivery irrigation, each project has unique and challenging requirements.

Institutional Greenhouse HVAC Services

Delta T Solutions works with engineers and architects to develop project specifications, and provide complete services for design, product selection, installation and system launch to suit the project's unique requirements. Whether the greenhouse is for research, display, conservation, education or other purposes, Delta T brings its combined HVAC and growing system knowledge to the project to develop effective and efficient growing solutions.

Services:

- **Customized base design** — Defining and developing system requirements and parameters
- **Equipment and operating specifications** — Creating complete specs unique to the project
- **Engineered drawings** — Designing to meet local codes and regulations
- **Professional installation and initial system startup** as needed
- **Commissioning** and complete maintenance protocols



We have more than 20 years of experience working with design professionals to create customized greenhouse growing environments. Our unique knowledge base of engineering and biological growing requirements, plus our in-house manufacturing of system parts assures high quality performance and durability.

Greenhouse HVAC System Overview

Hydronic Heat

Hot water heat creates a consistent growing environment, increasing root growth and discouraging disease. A hydronic system may include both a heated and a chilled water loop to provide for both heating and air conditioning.



Precise Control

Advantages of a radiant heating system include the ability to precisely control the temperature of plants and the greenhouse climate in dedicated zones. Direct digital controls provide precise environmental control, as well as energy and cost savings. Systems can be placed along perimeters or under gutters, under benches, and in the ground, whether the surface is concrete, soil, or gravel.

Complete Specifications

Delta T Solutions' hydronic heating systems for institutional and research applications are specified in consultation with engineers and architects to meet strict operating requirements. Depending upon the requirements of the growing environment, systems and products will be specified and fine-tuned to focus heating via tubing or finned pipe heating in specific areas, such as:

- High-output heating for perimeters or under gutters
- Aluminum under-bench heating
- In-floor heating (concrete)
- Complete heat source and system components

Finned Pipe Heat

Finned pipe heating, such as the DELTA-FIN™ TF under-bench system and the DELTA-FIN™ SF high-output systems for perimeters or under gutters, are engineered to provide excellent heat transfer and distribution, combining natural convection and radiation for targeted and controlled heating performance.

Tube Heat

Tube heating systems using rubber or poly tubes for bench, in-ground, or floor applications provide flexible options for consistent and efficient heating. These products include:

- DELTA-TUBE™ EPDM SD rubber tube bench heating
- DELTA-TUBE™ HD: Cross Link Polyethylene (PEX).

Chilled Water Cooling Systems

Many institutions use chilled water cooling systems in greenhouses because they offer more precision in cooling and control.

This provides very specific levels of temperature and environment control. Non-condensing chilled water coils offer a broader range of temperature control than evaporative cooling systems.



System Components

Complete heating and growing systems, including energy efficient boilers and heat exchangers, irrigation components, and operating elements are specified as needed to maximize each project's greenhouse growing environment and operational needs.



Institutional & Research **Experience**

Delta T Solutions' institutional and research greenhouse HVAC experience includes universities and colleges, research facilities (government, crop, chemical, pharmaceutical), public parks and zoos, schools and other teaching facilities, and estate gardens and arboretums:

- Stan Hywet Hall, Akron, OH
- University of Colorado
- USDA, Beltsville, MD
- North Carolina State University
- Harvard University
- Roger Williams Park, Providence, RI
- University of Pennsylvania
- Portland State University
- Toledo Zoo, Toledo, OH



To learn more about our institutional projects and capabilities, visit: www.deltatsolutions.com/ins/institutional.html, call **800-552-5058**, or email info@deltatsolutions.com.

