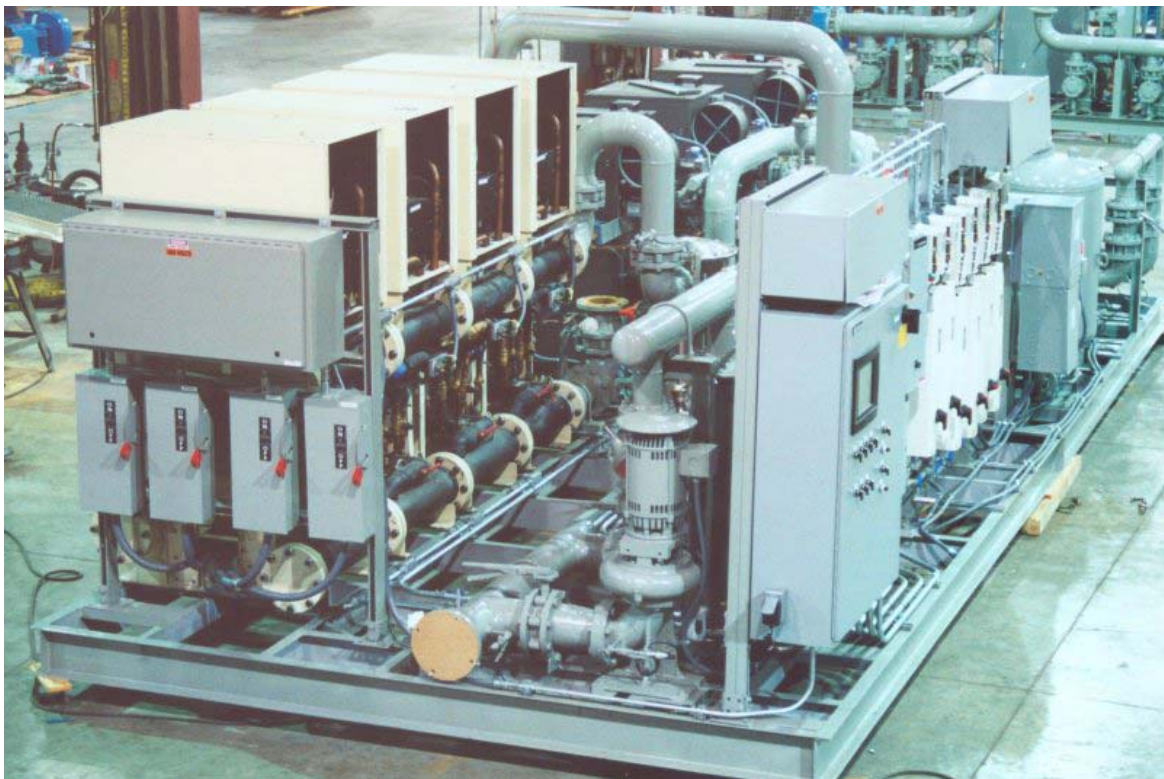

Complete Central Chilled and Hot Water Plant for Ohio School **Case Study**



A Central Chilled and Hot Water Plant for Beachwood Middle School in Beachwood, Ohio. The project included four modular chillers, three modular boilers, pumps and all hydronic specialties, and a complete control system. All components were run tested at Systecon's facility in West Chester, Ohio before shipping, with the exception of the gas boilers, these were commissioned in the field.

Systecon and the OSFC

What is the OSFC?

The Ohio School Facilities Commission was established in May 1997 as a result of the passage of Ohio Senate Bill 102. The mission of the OSFC is to provide funding, management, oversight and technical assistance to Ohio school districts for the construction and renovation of school facilities in order to provide an appropriate learning environment for Ohio's school children.

What Are Some of the Programs?

The Ohio School Facilities Commission takes part in partial funding of new schools. The funding is based on the need of the individual school district, with as much as 90% matching funds available for new construction and renovation. The OSFC also provides funds for energy efficient renovations that do not require local district approval. The OSFC provides the funding based on a payback calculation, and will fund the entire project when the criteria is met.

What Types of HVAC Systems Are Used?

With the OSFC's desire to have the highest energy efficient facilities possible, many of the designs are being driven towards central chilled and hot water plants. The OSFC recognizes that variable speed pumping in conjunction with chillers, boilers or geothermal heat pumps loops save energy, and have set up the recommendation that pumps 20 HP and over should be variable speed, and all pumps have premium efficiency motors. They are also recommending high efficiency chiller and boiler selections, driving projects to the high end of energy efficient equipment. Another key factor for the OSFC is limiting the mechanical room space to maximize usable floor plan area, and have placed a 6.9% of gross square footage limit on these areas.

Where Does Systecon Fit In?

For many years, Systecon has been recommending variable primary pumping systems for both the chilled water and hot water systems. The Systecon Combination VariPrime System (Case Study CS-005) has been used successfully on many OSFC projects to provide each facility with the maximum energy efficiency available for the water distribution system, while limiting the mechanical space required and reducing overall costs. Systecon's ability to provide a certified flow test for all variable speed pumps allows the engineer to meet the OSFC's energy guidelines and ASHRAE Standard 90.1 for variable speed certification. With guaranteed dimensions and an overall reduction in the number of pumps, Systecon can help keep the mechanical room space within required limitations. Many school districts across the country that Systecon has worked with have similar requirements.

The Next Step!

In the Fall of 2002, Systecon worked with a local consulting engineer and construction manager to evaluate constructing the entire central plant for Beachwood High School. The project included modular chillers and boilers, with the goal to lower overall installed costs and provide a guaranteed mechanical room size. This was needed to keep the project in budget and within OSFC guidelines. After an in depth evaluation, it was determined that Systecon indeed could provide the entire equipment room on one common base at a lower cost than the traditional field erected method. The job was specified and bid as such, and Systecon received the purchase order based on the previous pre-bid analysis. The project was completed in January of 2003, and shipped to the job site for installation.

The Beachwood School Plant

The packaged mechanical plant provided at Beachwood Middle School included:

Chilled Water System:

- Two 10 HP Chilled Water Pumps, Equipped with Variable Speed Drives.
- One 200 Ton Modular Chiller with Four Dual Compressors Modules.
- Air Separator, Expansion Tank, Chemical Shot Feeder, Make-Up Water Line, and Water Filtration.
- Pump PID Controls with Wire-To-Water Efficiency Optimization.
- Chiller Sequencing Controls with Variable Evaporator Flow Set-Up.

Condenser Water System:

- Two 15 HP Condenser Water Pumps, with Constant Speed Starters.
- Two 5 HP Cooling Tower Fan Variable Speed Drives.
- Condenser Pump and Cooling Tower Fan Controls for Chiller Optimization.
- Water Filtration with Automatic Blowdown.
- 1600 Gallon Cooling Tower Sump.

Hot Water System:

- Two 15 HP Hot Water Pumps, Equipped with Variable Speed Drives.
- Three 1750 MBH Modular Boilers.
- Air Separator, Expansion Tank, Chemical Shot Feeder, Make-Up Water Line, and Water Filtration.
- Pump PID Controls with Wire-To-Water Efficiency Optimization.
- Boiler Sequencing Controls with Variable Primary Flow Set-Up.

Control System:

- Used a Flat Panel Display with Full Color Graphics for Ease of Monitoring at the Equipment.
- Included ModBus Interface to the Temperature Control Contractor with over 100 Analog and Digital Values.
- All Color Graphics are Available to the Temperature Control Contractor in JPEG or BMP Format for Commonality of Control Displays.

Systecon Job List: State of Ohio Public Schools

❑ Zane Trace School (Chillicothe)	1998
❑ New Albany ES (New Albany)	1999
❑ Wadsworth School (3 Schools)	1999
❑ Morgan Schools (4 schools)	2001
❑ Mariemont High School	2001
❑ Meigs Middle School (Pomeroy)	2002
❑ Highland High School (Medina)	2002
❑ River Valley HS (Marion)	2002
❑ River Valley MS (Marion)	2002
❑ Milford Elementary School (4 Schools)	2002
❑ Beachwood Middle School	2002



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