

## Minnesota-grade heating system

### **New Ulm High School Gets an A+ from its Minnesota Community**



Students are now enjoying their new surroundings in New Ulm, MN – about two hours Southwest of Minneapolis.

The new, New Ulm High School, a modern beauty constructed at a cost of \$47 million, won high praise after its completion last year.

Today, close to 1,000 students are educated there. A healthy 17:1 student-teacher ratio and high student test results confirm they're doing things right in New Ulm.

## **New and old**

The New Ulm Public School district not only built a new high school but renovated existing facilities.

At full capacity for years, the school district needed the extra room. Portable structures were used as learning space, and more than 950 students were crammed into the old high school – many more than the state's DOE recommended for a building of its size.



The new, larger high school has state-of-the-art classrooms as well as collaborative learning spaces, a media center, a large commons area, multiple gyms and a performing arts center.

“I’m aware that the community struggled for a few years to win

approval for the new school, but the proof of its value has now been seen in the broad approval the administration has won, and high satisfaction registered by students and parents alike,” said Larry Sundberg, technical training and field support pro with St. Paul, MN-based manufacturer’s rep firm, Michel Sales.

Sundberg and Dan Dunham at Michel Sales helped to design and specify an innovative hydronic system to keep staff and students comfortable during brutal winter conditions there, and also to meet the plentiful domestic hot water needs throughout the sprawling facility.

## Hallberg Engineering

Keith Weinzierl at Hallberg Engineering, the firm chosen to design the sophisticated mechanical systems there, explained that they chose to build into the building’s mechanical plan a primary-secondary system with variable speed pumping that intelligently connects four high-efficiency, modulating-condensing boilers with variable-speed pumps.

The purpose of the technology is to optimally circulate BTUs, matched precisely to load.

“There are four, 2.5-million BTU Laars MagnaTherm boilers to provide heat,” said Sundberg. “Though, this was our first experience, and a good one, to work with the boiler manufacturer’s on-board pump/boiler modulation control platform, Vari-Prime.

It's designed specifically to optimize pump *and* boiler performance, matching pump flow to the modulation of each Laars boiler.

“With Vari-Prime, the boilers work in concert with the VFD-driven pumps so that, as zones call for heat, the variable speed pumps’ flow rate is matched with that of the boilers modulation rate. A boiler deltaT setpoint drives modulation to ensure the current amount of BTUs are being produced to match system load requirements,” added Sundberg.



“To share run-time among the boilers, their onboard controls allowed us to put them in a lead-lag configuration easily,” said Weinzierl.

Lead-lag sequencing is applied to assure that all of the boilers get equal run time. It also provides seamless operation year-round as each boiler takes its turn operating as the primary heat source, then taking a secondary role as other boilers activate as the load demands.

When boiler(s) modulate up and down, the pumps vary their performance accordingly. Over time, fuel use is reduced.

## Installation expertise



Minneapolis-based general contractor, Kraus Anderson, tapped El-Jay Plumbing & Heating, Inc., based in St. Cloud, MN, for mechanical installation of heating and cooling systems.

Working closely together on the school's hydronic system were El-Jay's jobsite supervisor, Dave Surma and project manager

Lon Rust who explained that they typically had eight installers on the project, all from the Minneapolis/St. Cloud Pipefitters Union 539.

“The engineered design that we worked with was excellent,” said Rust. “This was our first experience with Laars’ Vari-Prime, but by the time we completed the installation work and began the task of starting the equipment, we saw how well everything came together.”

***“We’ve been very pleased with the steady operation and energy efficiency of the boilers and, for that matter – the entire mechanical system.”***

### **Controls compatibility**

All facets of the mechanical system were connected by BacNet, which interacts seamlessly with the pump/boiler modulation technology.

Tyson Smith, a seasoned installer with Paape Energy Services, based in Mankato, MN, explained that he and others installed a Schneider EcoStruxure building management system to facilitate networking, graphics and servers – all connected as part of the Schneider “backbone.”

“Another part of the project that we came to appreciate was the ease with which we could connect to and interact with the MagnaTherm boilers via Vari-Prime,” said Smith. “Connected to it were the ABB variable frequency drives which added a level of efficiency to system pumping I’d not previously encountered. Too often, we still see constant-speed circulation, even for commercial facilities.”



“We’ve been very pleased with the steady operation and energy efficiency of the boilers and, for that matter – the entire mechanical system,” said New Ulm School District Facilities Director, Pat Lang.

“Because of the realities of winter, spring and fall here in Minnesota, we’re just as concerned about the ability of the system to provide gradual, low heat and comfort in the shoulder seasons as we are in the winter when the systems are working at peak [output],” added Lang. “We’ve now been through all seasons with the equipment and have experienced nothing but full comfort, year-round.”



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