



AT A GLANCE



Whitman Hanson Regional High School installed six Model CFC condensing boilers from Cleaver Brooks.

Photo: Cleaver Brooks

While building Whitman Hanson Regional High School in Massachusetts, engineers specified a Cleaver-Brooks ClearFire Model CFC condensing boiler for energy efficiency and an eco-friendly budget for the 270,000-sq.-ft. school.

The engineers installed six of these condensing boilers in the school. The annual gas savings for upgrading to these boilers is estimated to be 11,719 therms, which contributes to predicted annual energy savings of \$100,060.

The boiler features AluFer technology, which increases heat transfer over a bare boiler tube by a factor of five. This allows for a reduction in tube count and footprint. The high heat transfer comes about from the high heat conductivity from the alloy insert, the finned design that increases turbulence and heat transfer surface, and the division of the internal tube into eight flow channels, which creates maximum turbulence and heat exchange surface.

Lessons in boiler efficiency

An essential component of an energy-efficient building is a heating system that integrates high-efficiency boilers for comfort heating, reducing energy consumption, and lowering emissions. This also is economical.

This trend has become popular in the public sector—especially in budget-constrained school districts, where too often, not enough money is available for the basic educational requirements, let alone for increasing utility costs.

Recently, Architecture Involution LLC, Wayland, Mass., and its partners, including consulting firm Griffith & Vary Inc., Wareham, Mass., were hired to design and build a new high school in Massachusetts. When it came time to determine what type of heating system would be integrated into the design, they selected a boiler system that would achieve the greatest efficiency at all firing rates, and produce very low emissions.

Project details

Whitman Hanson Regional High School was bursting at the seams with students. The high school serves the communities of Whitman and Hanson, Mass., where an increase in student population and an aging, outdated building demanded the need for a new high school building.

The two communities contracted Architecture Involution LLC to design a new 270,000-sq.-ft. facility and to assemble a team of strategic partners to assist with the project. Griffith & Vary Inc. was selected to design the new school building's mechanical and electrical systems.

Because of increasing energy costs, the design team wanted to take advantage of financial resources from the electrical and gas utilities and the Massachusetts Technology Collaborative. The team decided to sustainably

design the new school building, and install high-efficiency mechanical equipment in the boiler room, lighting systems, renewable system technologies, and site considerations.

The boiler behind the savings

Because the school was being designed around the green theme, contractors wanted a boiler system that was both energy-efficient and eco-friendly. Based on experience, the engineers decided to install a Cleaver-Brooks boiler system—particularly the ClearFire Model CFC condensing boiler.

The ClearFire Model CFC achieves operating efficiencies to 99% when in full condensing mode. It does not require a minimum flow for vessel protections nor require a minimum return water temperature, providing an added value to school. And thus, the engineers selected six Model CFC boilers for a connected load of 10,800,000 Btuh input.

Energy and financial savings

According to the U.S. Dept. of Energy, utilities are the second largest single manageable item of a school budget behind personnel costs.

The typical school district of 3,000 students spends about \$400,000 each year on energy-related utilities, while districts located in large metropolitan areas spend \$20 million or more according to the National School Boards Association. On average, 25% of the energy used in a typical school is wasted due to the inefficiency of its systems and operations. In the same typical school, this amounts to \$100,000 wasted annually that could be used by other instructional or physical plant programs.

Nationally, energy inefficiency related loss amount to about \$1.5 billion annually. The cost of wasted energy equates to hiring 30,000 new

