



MASHPEE & QUASHNET LEGIOMIX® PROJECT AT-A-GLANCE

Location:

Mashpee Public Schools, Mashpee, Mass.

Contractor:

Commercial Boiler Systems, Pembroke, MA

Lead:

Bob Lee, President

Product Focus:

LEGIOMIX®

Challenge:

Consistent water temperatures and DHW disinfection

“CALEFFI FIGURES THINGS OUT AND COMES OUT WITH PRODUCTS THAT ARE EASY FOR THE PERSON IN THE FIELD TO OPERATE AND SERVICE.”

-BOB LEE, PRESIDENT OF COMMERCIAL BOILER SYSTEMS-



Overview:

Bob Lee, president of Commercial Boiler Systems, Inc., knows how to solve big problems. Some days he is selling and servicing 36 million BTU/hr. portable snowmelter machines to airports; other days he is being asked to revamp the domestic hot water system in an enormous school complex. Known for being an early adopter of innovative technologies, Lee knew that the Caleffi LEGIOMIX® electronic mixing valve would be an excellent fit for accurate domestic hot water (DHW) control and thermal disinfection at the Mashpee High School and adjoining Quashnet Middle School in Mashpee, Mass.

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SAFE WATER TEMPERATURE AND ENERGY

Lee started his plumbing and heating career while he was in high school. He began working with his father and went on to found his own business in 2004. He has built his business with a reputation for fixing tricky projects. He explains, “Every project we work on is odd. Things that are different, spark my interest. If you are constantly doing the same thing, you are going to get left behind.” He was a great fit for the Mashpee DHW system upgrade.



The initial scope of this Massachusetts school retrofit project was to replace aging thermostatic mixing valves that were in use for DHW. One of the three mixing assemblies was scaled up and struggling to maintain a proper mixed water temperature. That wasn't going to cut it for the Facilities

Supervisor at Mashpee Department of Public Works, Brad Tripp. Out of the many buildings he is responsible for, he knows the gravity of consistently delivering the correct water temperatures in a school. He also has a keen eye for energy savings.

Working as a team, Tripp and Lee knew that they could tap into energy efficiency upgrade funding from Mass Save®. “To ensure customers receive the benefits of high efficiency, the Sponsors of Mass Save have created the Commercial and Industrial Water Heater Initiative, a market transformation initiative designed to promote and improve the availability of

high-efficiency commercial water heaters.” It was a great fit for the new water heating system proposed.

Bob and the team rebuilt the system with new Lochinvar Armor® water heaters and three Caleffi LEGIOMIX valves for different wings of the school complex. The high school and kitchen needed a 1” LEGIOMIX. The science lab and a separate mechanical room used a ¾” LEGIOMIX. The middle school also utilized a ¾” LEGIOMIX for temperature control.

The basic sequence of operation is to thermally disinfect the hot DHW lines every week. When the building is at zero occupancies on a weekend night, the building automation system brings the DHW storage tank setpoint up from 150°F to 165°F.



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This saves energy because the tank is only maintained at 165°F during the short, weekly disinfection window.

Next, the Legiomix goes into disinfection mode, increasing the mixed supply temperature to be circulated with recirculation pumps. Caleffi ThermoSetter™ balancing valves are used to maintain recirculation temperature per branch as demand conditions change by modulating flow in each riser circuit. Essentially, excess recirculation with thermal balancing is avoided, which reduces unwanted heat loss and unneeded water heater run cycles. In disinfection mode, the ThermoSetter offers a one-of-a-kind feature, a bypass cartridge to allow for a higher flow rate than normal balancing operation to get through all the branches, controlled through a 24VAC signal. The result is a well-coordinated thermal flush throughout the massive school campus.

The facilities had existing point-of-use mixing valves under all lavatories throughout the buildings. If someone happened to be in the building during

the thermal disinfection, they would be protected from scalding while using the sink. A terrific choice in this situation would be the labor-saving Caleffi SinkMixer™ 4-way scald protection, point-of-use thermostatic mixing valve.

FLEXIBLE PROGRAMMING IS KEY

As is the case with just about all large projects, an interesting challenge came up during commissioning. Effective disinfection of Legionella bacteria has a time and temperature relationship. A water temperature of 160°F is required to achieve immediate disinfection. The smaller middle school system performed as anticipated; the temperature of the recirculation line reached the necessary temperature of 160°F quickly. However, the hot water recirculation line in the high school is very long and the return temperature was consistently colder than planned. Because they were using the digital control capabilities of the LEGIOMIX, they were easily able to program the larger electronic mixing valve at the high school to maintain a return temp of 144°F for 45 minutes. This approach works just as well as the quick 160°F return to kill the Legionella bacteria. The alternative may have been re-piping the high school recirculation line, which would have meant major surgery to the building. Lee noted, “The LEGIOMIX is easy, accurate, stable, and simple to work on. I work in a lot of nursing homes and care facilities. Having accurate thermal mixing valves is a must. Avoiding scalding is essential.” He also likes the tailpiece connection flexibility, “I have used Caleffi products for years. I really like the double union connections. In, out, boom, boom, easy to install and service.



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VERIFIABLE DATA IS WORTH A MILLION

Beyond the technical flexibility of the LEGIOMIX, documentation is key. Building managers have the ability to log in to the automation system and see the exact temperatures, completed disinfection cycles, and balancing valve open/close cycles. These data points help confirm that they are getting it right, beyond the last day of commissioning. “The ability to log in to the BMS and show the exact mixed water temperature at any given time from the data logging is important. For people like Brad Tripp, that is worth a million dollars,” said Lee. Lee’s long-standing expertise, coupled with Tripp’s attention to detail, created a strong team that provided an excellent solution for the school district. Now, the students and parents

may worry about that math test on Monday, but not wild fluctuations in the hot water fixtures.



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sales@caleffi.com

TECHNICAL SUPPORT:
techsupport.us@caleffi.com

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