

START-OF- THE-ART INTELLIGENT PERFORMANCE

COMMERCIAL
MIXED USE
RETROFIT PROJECT

A pair of Design Envelope VIL pumps are using Sensorless, self-adjusting speed control to provide the exact performance required by a temporary heating system.

Academy House, Locust Street, Philadelphia

The Armstrong Design Envelope 4300 Vertical In-Line (VIL) pump offers unmatched performance flexibility and cost efficiencies, plus industry-leading control and connectivity capabilities.

“It’s amazing that these new pumps can give us high-efficiency operation at such low flow rates while we wait for the boiler installation. And then be even more efficient at full capacity. Great technology.”

Albert Pantalone,
Elliot Lewis

Located in the heart of Philadelphia’s Avenue of the Arts cultural district, Academy House is a 37-story mixed use facility. The building includes over 570 residences as well as commercial space on the lower floors.

When it was first constructed the building used a conventional steam heating system, drawing from Philadelphia’s centralized steam network. In late 2016, building managers identified a need to upgrade to a fully independent heating system using gas-fired, high efficiency condensing boilers and self-modulating pumps.

Elliott Lewis, a Design-Build contractor with offices in the Philadelphia area, signed on as the main contractor for the retrofit project, and provided the design for the new heating system. Representatives from Armstrong worked closely with Elliott Lewis to configure the piping and size the pumps.

Given the complexity of the project, and the timelines involved in a complete changeout of the mechanical room, it was decided to approach the retrofit in two phases. Phase 1 would be completed in the summer of 2017, and would focus on establishing a temporary heating system, supported by an Armstrong Shell and Tube heat exchanger and 2 VIL Design Envelope pumps. Phase 2, involving the installation of the condensing boilers and 8 more pumps, would be completed in the summer of 2018, with plans for final commissioning by the end of August.

By September 2017, the temporary heating system was in place, with 2 HW pumps supplying flow to most of the building, using a Shell & Tube heat exchanger to distribute the heat to the hot water loop.

In line with the requirements of the temporary system, the two new state-of-the-art pumps are operating in a duty-standby mode, under the control of the embedded Parallel Sensorless Pump Control unit, rotating duty every seven days to ensure even usage. The two Design Envelope VIL pumps are currently operating at 50 GPM, well below their

final capacity of 370 GPM. Given the advanced capabilities of Design Envelope solutions for matching pump speed to flow requirements, the pumps are still relatively efficient, even when operating so far away from the original design point. The Design Envelope 1 to 10 HP range are fitted with Permanent Magnet motors. The 7.5 HP motors on the Academy House pumps are 2.8 percentage points more efficient than NEMA premium induction motors at full load. (92.3 % vs 89.5%). The improvement in efficiency increases at part load (89% vs 77%). The high efficiency motors are quiet, too, as the motors use cooling fans that are smaller than those found on induction motors. This size of motor is rated at just 69.2 dba at a 3 ft distance.

When the new heating system is completed and fully commissioned, the pumps will modulate speed to meet system demand at any given time and are expected to operate closer to 370 GPM.

The choice of Armstrong Design Envelope VIL pumps led to substantial cost savings on installation. VIL pumps are mounted in the piping, with no requirement for inertia bases, wall-mounting hardware or flex connectors. Perhaps more importantly, the contractors were able to mount the pumps in an elevated location, substantially reducing the requirement for floor space. Weighing in at just 103 lbs each, the pumps were easy to install. Using an on-board WiFi router, the pumps can connect to a smartphone or laptop PC for performance monitoring and adjustment of any settings. This summer will see the finale to the Academy House retrofit project, when the boiler and the remaining 8 Design Envelope pumps are installed to serve the full building.

Tech-facts Solutions installed:

2 x Design Envelope 4300 0305 - 005 - 007.5 pumps

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