UNDERSTANDING OVERSIZING

AN INSTITUTIONAL FACILITY INSTALLATION

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King Hamad American Mission Hospital (KHAMH), Bahrain

The Design Envelope Integrated Pumping System (IPS 4000) is an advanced multi-zone control that directly integrates with pumping units to optimize energy performance and system handling.

Background

The King Hamad American Mission Hospital (KHAMH) is the largest branch of the American Mission Hospital in Bahrain, and one of the most advanced multi-specialty hospitals in the region. KHAMH is also the Kingdom's first eco-friendly hospital, aligning with its commitment to both wellness and sustainability.

The focus on sustainability was the impetus for a project to upgrade the HVAC system. The original chiller system met the performance requirements for cooling, but had been designed with a cushion, or safety factor, of approximately 25% additional pressure capabilities, which meant it was oversized for the actual cooling load.

Designing in performance safety factors in HVAC equipment is a common practice. While it's valuable to have a margin of safety in place, unnecessarily large safety factors in systems can have significant consequences, both in terms of cost and environmental impact. HVAC systems that are improperly sized can suffer up to a 30% loss in overall efficiency, leading to higher operating costs and increased carbon emissions. This is primarily due to larger chilled and condenser water pumps, which inevitably consume more energy.

Over-designed systems can also experience a phenomenon known as 'short cycling', where pumping excessive flow into the chiller causes temperature fluctuations, prompting the system to start up and shut down in rapid succession. This not only negatively impacts occupant comfort, it also causes undue wear on system components such as the compressor, blower fan, motor, and pump.

By implementing Armstrong's IPS and Design Envelope pumps, KHAMH experienced significant reductions in cooling and pumping energy consumption. With the upgrade project, annual operating costs of the pumps were reduced from $157,000 to just $93,000, for savings of over $63,000 per year. This result serves as a testament to the value derived from integrating smart technology into HVAC systems.

Reflecting on the success of the upgrade project, Qusai Abuabed, Sales Leader MEA commented: "It's very rewarding being able to help customers reduce the costs of operating HVAC systems. Design Envelope pumps and Armstrong's advanced control solutions are a great combination, and the newest selection capabilities in ADEPT make it so much easier to find the exact size needed."

Tech-info

- Armstrong Design Envelope Primary Pumps
- Integrated Pumping System (IPS)
- 4003w Primary Variable System
- Suction Guides
- Flo-Trex Valves

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