CASE STUDY

ensuring environmental integrity

Adaptable Space - University of Wisconsin Institutes for Discovery (WID)

Background

On a timeline stretching many decades into the future; if asked to mark a goal for building sustainability where would it be? For the Institutes of Discovery, (University of Wisconsin, Madison) it was 100 years. An ambitious goal among

Wisconsin Institute for Discovery (WID)

many other ambitious goals for this new construction – a joint public/private venture between U Wisconsin and the Morgridge Institute for Research.

The University of Wisconsin - Madison wanted to create a research building with a 100 year lifespan. Looking at other buildings on the Madison campus, a 50% CO^2 reduction and 50% lower water use became sustainability targets. The research facility would house BSL-3 and other labs; as well as provide public spaces to actively engage the non-academic community. Safety and airflow control were an obvious concern. And so, the multi-floored 300,000 sq ft Institutes for Discovery in downtown Madison came into being.

The Situation

The first floor is mostly "public space" with research pods on the floors above, which include separate teaching labs that can be used by public groups, companies, or for students. Inclusion of public space to purposefully engage the community outside those resident in the facility was mandated.

Shared space on the research floors was incorporated in the design to encourage collaboration between and among university and Morgridge Institute researchers. Each floor is home to both the Morgridge Institute for Research and the Wisconsin Institute for Discovery; each housed in separate "pods" but sharing a central area mutual to both. The intent of this design is maximizing interaction between the two research groups while maintaining the integrity of the separate research spaces.

A lot of innovation is in this building, starting with concepts driving the design – lab flexibility being one of them. Product selection was key to achieving the required level of flexibility.

The Solution

To help make the design a reality, Phoenix Controls venturi valves were installed. All lab fume hoods are fitted with high-speed Celeris® shut-off valves initially setup for constant volume. Celeris valves were selected for their ultimate flexibility should the type of fume hood setups currently being used evolve to include demand based ventilation, Variable Volume, and Zone Presence sensors® (also known as ZPS® sensors) Shut-off capability for all fume hood valves was a practical necessity since the labs are re-arranged to conform to different researcher's requirements; with fume hoods being removed as needed. The shut-off functionality also helps conserve energy by enabling hibernation mode when not in use, reducing the WID carbon footprint.

A member of the lab controls team was Dan Bergmann from Masters Building Solutions, who supplied Phoenix Controls venturi valves for labs in the building. "All of the fume hoods in this building have Celeris high-speed valves with shut-off capabilities. The fume hoods are low-flow constant volume for now. The optional shut-off feature is ideal because the labs are periodically re-arranged based on the different researchers' needs. The labs wanted to be able to add or remove hoods to or from a lab and shut-off the airflow when the hoods are not in place. The Celeris valves vast abilities gave the labs a kind of "ultimate flexibility". For the future, they could change the type of fume hoods used in any of those spaces with a minimum amount of cost and disruption."

Another element of the building's sustainability was installing reconfigurable lab pod utilities adaptable to changing research needs. Celeris valves enhanced the flexibility options for configuring/reconfiguring the pods while directly supporting the lower energy consumption and reduced carbon footprint sustainability goals.

Safety and comfort was also a focal point for building design. WID is intended to be as open to the public as possible without compromising goals of epicenter-class research facility for biology, technology, and engineering. Windows in the external shell open for fresh air to public spaces, making internal climate control a bit trickier. There are, in fact, very distinct zones within the building each with its own airflow control requirements. The multiple zone balance capabilities of Phoenix Controls valves made them ideal for this application. The technology driving these valves is configurable to the airflow requirements keeping each space pressurized within a particular zone; taking into consideration variables like duct pressure, temperature, occupancy, and fume hood usage.

Celeris valves also offered the highest value proposition because their wide flow range, high turndown ratio, and setback capability. Using chilled beams with some of the valves further enhanced the energy savings.

The Result

All the Celeris valves were integrated into the JCI BMS via a Phoenix Controls MicroServer™ and are managed by an integrated system of local controls and the BAS. Phoenix Controls is designed to be integration-friendly with any BMS controls partner. Using a MicroServer helps manage data transfer from room-level to the BMS. That support helps ensure a fast speed of response to pressure changes is maintained; keeping the integrity of research intact and the researchers safe.

- **WID Awarded LEED Gold-Certification**
- **WID chosen the R&D Magazine 2012 Laboratory of the Year.**