CASE STUDY

keeping laboratory air safe

Kansas University
Integrated Science Building

Background

To enable more researchers to pursue discoveries in life sciences and material sciences, Kansas University (KU) is building an Integrated Science Building (ISB). Located on KU's main campus in Lawrence, Kansas, the new building is a significant part of the university's Central District Redevelopment Plan.

"Finding a balance between teaching and research, the ISB will house new chemistry teaching labs that help ensure students have access to the latest techniques, while also allowing students to see research advances in the same building," said former KU Provost Jeffrey Vitter.

One of the scientists who will use the new facility is KU distinguished professor Steven A. Soper, PhD. Dr. Soper is developing a new tool he calls "Lab on a Chip (LOC)" to diagnose and monitor treatment of cancer patients. A clean room in the ISB will allow his team "to scale the production of LOCs to make them a commercially viable platform," said Soper.

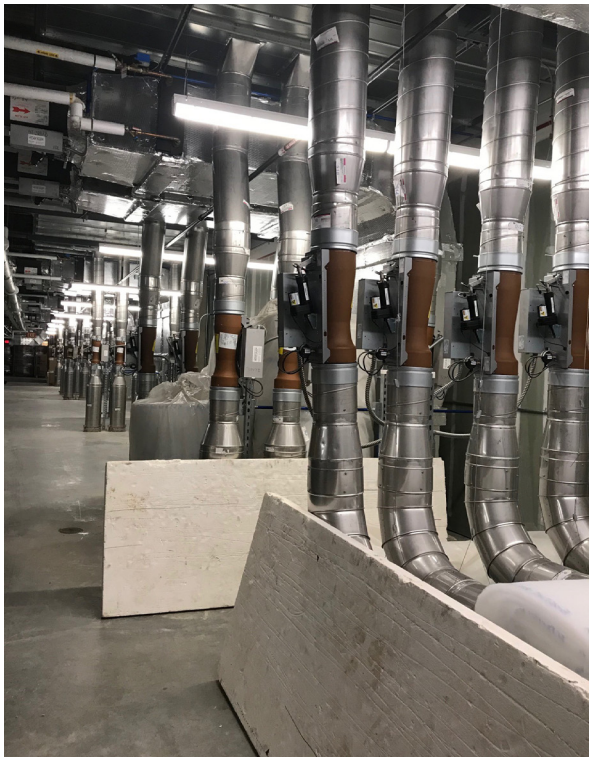
Designed by Perkins + Will, the ISB is a public-private partnership between KU and developer Edgemoor. Scheduled opening is summer 2018.

The Situation

As with any laboratory design, sufficient airflow control is crucial for protecting lab occupants from airborne hazards, such as toxic fumes, reactive gases and pathogens – all common in life sciences and material sciences research labs.

The KU Integrated Science Building presented additional airflow control challenges. Chief among these was a "very aggressive system diversity of 60%, which grew more complex as the project team completed the design," said Rex Mustain, president of airflow controls representative Associated Air Products (AAP) (Lenexa, Kansas). Diversity is designing a system for less capacity than the sum of all peak demands. This project's 60% diversity level is well above the 10% to 20% target commonly used in labs. This requires precision airflow control and high turndown venturi valves to meet such demanding standards while maintaining safety.

In short, the airflow control system design needed to account for frequent high demand loads to ensure safe air in a building with difficult-to-control spaces – numerous open labs and atriums – while also being energy efficient.



The Solution

KU has used Phoenix Controls products – including venturi valves for their fume hoods, and direct digital controls – since 2005 in 10 or more facilities on campus, including the recently upgraded Malott, Haworth and Learned Halls, and Simons Labs.

As Phoenix Controls solutions have become the standard for KU, the project team installed the following Celeris® high speed, chemistry control platform products in the Integrated Science Building:

- 560+ Phoenix Controls CELERIS High Speed venturi valves
- 217 VANTAGE Digital fume hood controls
- 10 RMI300 Smart room integrators for distributed control

In addition to these products' superior performance and reliability, Mustain explained that the Phoenix Controls solution was the "clear choice for fast track construction of a world class lab under a tight budget."

"To balance safety and energy savings, we also included a mix of medium-pressure and low-pressure valves throughout the ISB," said Mustain. "There's a common misperception that you can't mix these valve types, but the Phoenix Controls venturi valve's high turndown airflow metering design that provides repeatable mechanical pressure independence enables us to provide low- and medium-pressure valves on any system design."

Phoenix Controls product details

The Celeris control platform leverages the superior airflow control made possible by the Phoenix Controls venturi valve to provide the safest, most cost effective solution for control of fume hood labs and high performance research facilities.

Phoenix Controls venturi valves

The Phoenix controls venturi valve is the most accurate airflow control valve in the market today, even at low pressure. While still maintaining precise airflow, the valve ensures the minimum amount of differential pressure is used, to achieve energy savings while also ensuring safety.

Fume hood controls

Phoenix Controls offers a comprehensive portfolio of products for fume hood control that includes sash sensors, Zone Presence Sensors®, fume hood displays and fume hood valves and controllers. Phoenix Controls' wide variety of fume hood sensors work with the most accurate airflow valves in the industry to ensure face velocity at the hood opening is maintained at a safe level.

RMI300 room integrator devices

The Room Integrators provide protocol translation and data integration between Phoenix Controls' environmental control systems and BACnet® capable building automation systems (BAS).

The Result

"Safety is the highest priority in any lab," said Mike Russell, director of KU Environmental Health and Safety. "The lab ventilation system, along with its various connected hoods and exhaust devices must reliably capture, contain and exhaust potential hazardous lab emissions. For more than 12 years Phoenix Controls systems have performed exceptionally well across our campus, and provide an assurance of safety, as well as allowing us the ability secondarily to address energy savings."

The Phoenix Controls solution "provides KU with low cost of ownership and system flexibility for a world class safe lab on a budget, that can be used to attract key research talent and grants – and ultimately peace of mind," added Mustain.

Specifically, the Phoenix Controls system allowed Mustain and AAP to meet the aggressive 60% diversity design requirement, while being able to control air with a differential pressure as low as 0.3" wc at the room level – for both safety and energy savings.