

# Greenheck Project Profile

## Grand Canyon University

### College of Arts and Science Building

Phoenix, AZ

- **Mechanical Engineer:**  
MSA Engineering Consultants  
Phoenix, AZ
- **Contractor:**  
Pono Construction  
Phoenix, AZ
- **Subcontractor:**  
Central Supply & Metal Company  
Phoenix, AZ
- **Architect:**  
Orcutt | Winslow  
Phoenix, AZ
- **Greenheck Representative:**  
Air Specialty Products  
Mesa, AZ



Top: One of six science laboratories  
Right: Exterior view of the College of Arts and Science Building



## The Challenge

- **Safely expel exhaust fumes from laboratories high above the surrounding dormitories**
- **Invest in an energy-efficient laboratory exhaust system to reduce energy costs enough to pay back the entire system cost in two to three years**

Construction of a new, four-story College of Arts and Science building with state-of-the-art science and nursing laboratories began in November 2011 on the campus of Grand Canyon University in central Phoenix, Arizona.

The project was completed in time for the fall 2012 classes. Grand Canyon University was founded in 1949 as a premier Christian college, and now serves over 6,000 students. The fourth floor of the new building includes six science laboratories with fume hoods and two simulation and skills laboratories without fume hoods.

The building is located in a nonindustrial area with nearby dormitories and other housing. Effective fume dispersion high above the building that prevents reentrainment of the fumes into nearby fresh air intakes



One of three Greenheck Vektor-HS fans installed to safely expel exhaust fumes from laboratories.

in residential buildings was essential.

# Greenheck's Solution

## ● Three Vektor®-HS Laboratory Exhaust Systems

Due to varying classroom sizes and laboratory activities throughout the day in the new College of Arts and Sciences building, Grand Canyon University officials wanted a laboratory exhaust system that would be both effective and cost-effective to operate. The solution was Greenheck's Vektor®-HS laboratory exhaust system, which was specifically engineered for demand-based laboratory ventilation. Three Vektor-HS systems were installed to respond to varying demands of the fourth floor laboratories. The Vektor-HS, with Greenheck's Sure-Aire™ variable volume exhaust (SÄVVE) technology, utilizes a

unique variable area discharge nozzle and noninvasive airflow monitoring. The system maintains the required ANSI Z9.5 discharge stack velocity (3,000 fpm) during nonpeak periods by automatically reducing fan speed during low use periods and simultaneously decreasing the discharge stack area. And, energy usage is reduced for quieter, more economical operation.

Greenheck's Vektor-HS systems typically can reduce energy costs by up to 60% when replacing existing laboratory exhaust systems in demand-based laboratories. All controls in the new Vektor-HS are prepackaged at the factory making installation quick and easy. Greenheck Vektor series laboratory exhaust systems are engineered to remove hazardous or noxious fumes



*Prepackaged controls for the Vektor-HS make installation quick and easy.*

from a laboratory, dilute the fumes as much as possible, and expel them from the laboratory building so that the fumes do not contaminate the roof area or re-enter the building's make-up air system.

## The Results

● Start-up of the systems went very well, and building owners were pleased with the quiet operation of the Vektor-HS and its ability to respond to varying laboratory exhaust loads. Payback analyses of potential energy cost reductions for the three Vektor-HS units revealed

that the units will be paid back in two years or less due to their ability to reduce fan speed while still providing the required discharge velocity. "Based upon past performance and reliability, and coupled with the ability to maintain a constant discharge velocity while reducing energy

consumption, the Vektor-HS became the clear design choice," said MSA Engineering Consultants.

Building owners also liked how the low-profile, compact Vektor rooftop units did not distract from the new building's overall appearance.



# Greenheck Project Profile

## George R. Rieveschl Hall, University of Cincinnati Cincinnati, OH

- **Mechanical Engineer:**  
Fosdick and Hilmer  
Cincinnati, OH
- **General Contractor:**  
Messer Construction  
Cincinnati, OH
- **Mechanical Contractor:**  
Thomas J. Dyer Company  
Cincinnati, OH
- **Greenheck Representative:**  
Environmental Air Products  
Cincinnati, OH



*George R. Rieveschl Hall at the University of Cincinnati*

## The Challenge

- **Install a laboratory exhaust system that effectively exhausts laboratory fumes out of the building and away from nearby homes and dormitories**
- **Select and install a laboratory exhaust system that minimizes energy usage**

Ranked as one of America's top public research universities, the University of Cincinnati has an enrollment of more than 42,000 students. Many of the university's biology and chemistry students, as well as faculty are engaged in important research projects. They spend a considerable amount of time in Rieveschl Hall, an eight-story science research and resource

center. Rieveschl Hall was built in 1969 and has undergone extensive renovations to improve energy efficiency and functionality since 2009.

Prior renovations of laboratory ventilation systems (including Greenheck Vektor energy recovery laboratory exhaust systems) as well as upgrades to utilities, mechanical, electrical, plumbing and lighting systems at Rieveschl Hall and other campus buildings have reduced energy use by up to 70 percent and are saving the university up to \$500,000 annually.

In 2011, the University began upgrading its laboratory exhaust



ventilation system on the sixth and seventh floors of Rieveschl Hall and completed that project in the spring of 2012. The newly renovated organic laboratories feature multiple ventilated fume hoods that limit users' exposure to hazardous material and allow students and researchers to conduct experiments in a safer laboratory environment similar to organic chemistry laboratories in the chemical industry.

# Greenheck's Solution

## ● Two Vektor®-HS-22

Two Greenheck Vektor®-HS demand-based laboratory exhaust systems, with the capacity to move approximately 8,000 cfm, were selected for this project due to their reliable air performance and their ability to reduce energy costs.

Greenheck's Vektor-HS is capable of reducing energy costs in demand-based laboratory exhaust systems by over 60%. When airflow demand decreases during non-peak periods of laboratory usage, Greenheck's Sure-Aire™ Variable Volume Exhaust (SÄVVE) technology maintains a constant duct static pressure by reducing the fan speed with a variable frequency drive. As airflow through the

fan varies, a unique, variable area outlet nozzle automatically adjusts to maintain a constant and safe discharge velocity. (ANSI Z9.5 requires a minimum 3,000 ft./min.) As a result, fan speed and energy usage are reduced for quieter, more economical operation.

All controls in the new Vektor-HS are pre-packaged at the factory for easy installation. In addition, Greenheck's Vektor series of laboratory exhaust products are low profile, small footprint, self-contained units constructed of heavy gauge, corrosion resistant coated steel. They also do not require guy wires.

They're ideal for replacing older fans with taller stacks that consumed more energy, delivered unreliable



*Greenheck's Vektor-HS is capable of reducing energy costs in excess of 60% based on system operation.*

performance, were much more expensive to install, and required guy wires on the roof to prevent being toppled by high winds.

## The Results

● The Greenheck Vektor-HS laboratory exhaust systems installed at the University of Cincinnati are expected to significantly reduce energy costs when compared to more traditional variable volume laboratory exhaust systems that utilize bypass air dampers.

Consulting engineer Tom Crompton, director of mechanical engineering at Fosdick and Hilmer, specified

the Greenheck Vektor-HS laboratory exhaust systems based on their potential to reduce energy costs. "It was really good news when Greenheck introduced this product," Crompton said. "The Vektor-HS has very good payback potential, and it's ideal for a university laboratory environment where occupancy goes from max to zero every day and you need to be able to control the variable

volume exhaust. The installation went very well."

In addition to reducing energy costs due to its ability to maintain constant pressure at lower fan speeds, the Vektor-HS system operates much quieter during off-peak demand. This is especially advantageous to other tenants who occupy Rieveschl Hall's library, classroom and office facilities.

