

LABS & RESEARCH FACILITIES

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Looking Beyond the Fume Hood: Why Lab Containment Decisions Shape the Future of Academic Facilities

BY KASEY FULMER

Private colleges and universities continue to invest in laboratory space as they expand research capabilities, modernize science buildings, and create environments that attract both students and faculty. Whether constructing a new facility or renovating existing labs, the goal is the same: designing spaces that will support the institution's mission for years to come.

Within those conversations, containment equipment is sometimes viewed simply as a laboratory requirement. A fume hood is specified, incorporated into the design, and installed alongside other equipment needed for the space. In reality, containment decisions influence far more than the work taking place inside the hood itself.

Laboratories operate as interconnected systems. Airflow, infrastructure, energy consumption, future flexibility, and occupant safety are linked in ways that may not be obvious in early stages of planning. Understanding those connections helps institutions meet current needs while supporting future goals.

The Starting Point Is the Science

Successful laboratory projects begin with a clear understanding of how the space will be used.

An undergraduate chemistry teaching laboratory has very different demands than a faculty research laboratory investigating new materials or pharmaceutical compounds. Procedures, materials, and anticipated research activity all influence containment requirements.

Universities rarely design facilities solely around current needs. Academic programs evolve, research priorities shift, and new opportunities emerge throughout the life of a building. A laboratory serving one area of study today may serve a completely different purpose a decade from now.

This reality encourages institutions to think beyond immediate requirements and consider how containment decisions made today may affect future possibilities.

Planning for Future Growth and Change

Higher education has always been dynamic. New faculty members bring different research interests, funding priorities evolve, and interdisciplinary collaboration creates opportunities that may have been difficult to anticipate.

Rather than trying to predict every future need, many universities focus on creating laboratories that can adapt as those needs change.

When people discuss flexibility in laboratory design, they often think about movable furniture or adaptable floor plans. Those elements are certainly important, but containment planning plays a role as well. Decisions involving ventilation strategies and supporting infrastructure can influence how easily laboratories accommodate new research programs or changing academic priorities over time.

The most successful facilities are often those that provide options. They support today's work while preserving the institution's ability to respond to tomorrow's opportunities.

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Containment Is Also an Infrastructure Decision

One of the most important aspects of containment planning is understanding its relationship to the building itself.

A fume hood does not operate independently. It becomes part of a larger mechanical system that affects airflow throughout the laboratory and, in many cases, throughout the entire facility. Because of that relationship, containment choices can have implications well beyond the laboratory bench.

This is especially relevant during renovation projects. Many colleges and universities are updating buildings that were designed decades ago, often before today's laboratory standards and research expectations emerged. Existing infrastructure may present both opportunities and constraints that influence project decisions.

Available mechanical capacity, building layout, and the realities of working within an existing structure all become part of the discussion. Recognizing these factors early helps project teams identify solutions that align with both the institution's goals and the building's capabilities.

Looking Beyond Initial Equipment Costs

Construction and renovation budgets naturally receive significant attention throughout the planning process. Initial acquisition costs are visible and immediate, making them an important part of any project evaluation.

Yet laboratories are long-term investments, and many institutions are increasingly taking a broader view of project economics.

Ventilation systems operate continuously. Conditioned air must be supplied, exhausted, and replaced every day the facility is in use. Over time, the operational impact of those systems can become just as important as the purchase price of the equipment itself.

As a result, universities often consider questions that extend beyond upfront cost. How will a particular approach affect operating expenses? How might it influence maintenance requirements throughout the life of the building? Will the solution continue supporting the institution as needs evolve?

By considering these questions during the planning phase, institutions can develop a more complete understanding of long-term value.

Sustainability and Laboratory Performance

Sustainability has become an increasingly important objective across higher education. Colleges and universities are evaluating how their facilities consume energy and looking for opportunities to reduce environmental impact without compromising performance.

Laboratories deserve particular attention in these discussions because they are among the most energy-intensive spaces on campus. Ventilation systems contribute significantly to that demand, making containment planning an important part of broader sustainability initiatives.

Advances in laboratory design have created new opportunities to improve efficiency while maintaining effective containment. At the same time, sustainability goals must be considered alongside the fundamental purpose of containment systems: providing protection for laboratory users and supporting the work being performed.

When those objectives are evaluated together rather than separately, institutions are often able to develop solutions that support both operational performance and environmental goals.

Airflow as a Strategic Consideration

Few building systems have a greater influence on laboratory performance than airflow.

The effectiveness of containment equipment is closely tied to how air moves throughout a laboratory. Airflow patterns can affect user protection, energy use, and the overall operation of the facility. For that reason, discussions about containment frequently lead to broader conversations about ventilation strategy.

Project teams may evaluate topics such as variable air volume approaches, occupancy patterns within the laboratory, and the institution's long-term operating objectives. These conversations are often most productive when facilities professionals, laboratory users, safety leaders, architects, and engineers are involved early in the process.

Each stakeholder brings a different perspective, but all are working toward the same outcome: a laboratory environment that performs reliably and supports the institution's mission.

Designing for the Long Term

Laboratory planning is ultimately an exercise in balancing present needs with future possibilities.

Containment decisions influence safety, building performance, operational costs, and flexibility in ways that extend far beyond the equipment itself. While it may be tempting to view a fume hood as a standalone component of the laboratory, its impact is often felt throughout the facility for years after installation.

Universities invest in laboratories because they invest in discovery. They invest in educating future scientists, supporting faculty research, and creating opportunities for innovation. The facilities that best support those goals are rarely the result of a single decision. Instead, they emerge from thoughtful planning and a willingness to consider how each element contributes to the larger environment.

When containment is viewed through that broader lens, the conversation becomes about more than selecting equipment. It becomes an opportunity to create laboratory spaces that remain effective, adaptable, and valuable throughout the life of the facility.



ABOUT THE AUTHOR: Kasey Fulmer is the Product Manager of Labconco Corporation, a privately-held company dedicated to building superior laboratory equipment.



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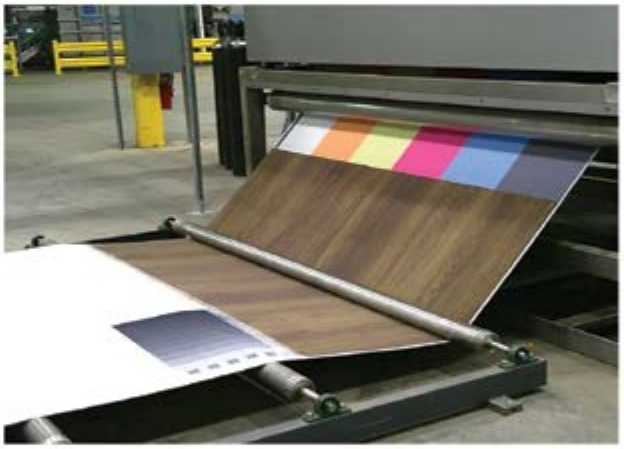
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