



Laboratory Solutions

Achieve the highest level of safety, flexibility, and efficiency in your laboratory environments — all from one source.

Building Technologies

SIEMENS



safe
flexible
efficient

Siemens Building Technology, Inc.

Responsiveness, application expertise, project management, training, service, value, single source responsibility.

Whether you are responsible for one laboratory or hundreds, the issues are the same: staying abreast of laboratory regulations, safety concerns, efficiency and sustainability opportunities and implementing solutions that best meet the needs of everyone involved with a laboratory project. No small task.

These issues have prompted many leading companies worldwide to include Siemens Building Technologies on their projects. When our laboratory application professionals join your team, they bring decades of experience designing, installing, commissioning and servicing laboratory building automation systems (BAS) that meet increasingly stringent safety, efficiency and regulatory requirements. Moreover, our experts deliver a wealth of application information and proven ideas that your team can employ to solve the most challenging problems at your facility quickly and cost effectively.

Our overriding goal is to deliver solutions that meet your most pressing needs:

- Cost-effective methods to improve the safety and energy efficiency of existing laboratories
- Flexible ventilation strategies to keep pace with rapid changes occurring in your labs
- A portfolio of integrated controls, monitoring devices and value-added services to ease staffing and budget issues
- Performance testing and record keeping to document compliance of your laboratories, fume hoods and biosafety cabinets with all current regulations

By including us on your team, you'll find us eager to apply our laboratory technology, services and project management expertise to make your project a success and to ensure everyone on the team is completely satisfied.

Laboratory Solution: All from one source.

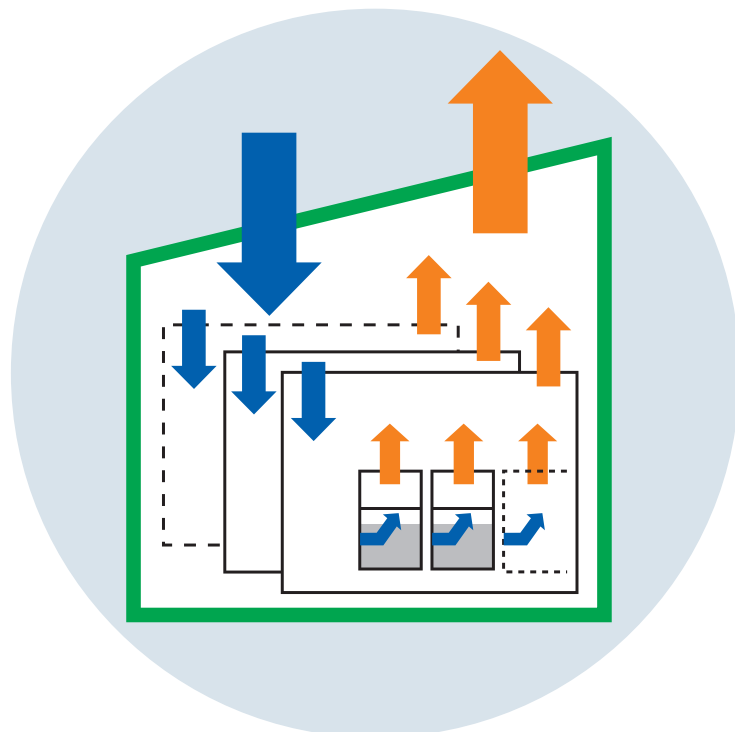
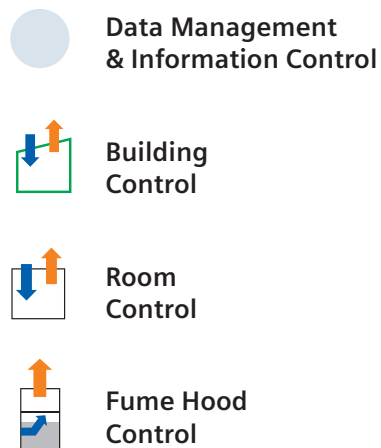
**Best building performance:
Safe, Flexible, Efficient**

Siemens has developed a solution set for laboratory facilities that takes a comprehensive approach to meeting the challenges you face every day. From the initial assessment through ongoing support, we provide the systems, the services and the resources to ensure that your facility is as compliant, efficient, cost-effective, secure and safe as it can possibly be. Combining advanced automation technology with extensive industry expertise, the strength of the Siemens solution lies in the close integration of its technological and procedural-based elements.



safe
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Laboratory Solution:





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Complete Laboratory Solution

| Assessment Surveys | Engineered Solutions | Information Management | Service Solutions |
|---|--|--|--|
| <ul style="list-style-type: none"> • Lab Ventilation & Safety Assessment • BAS Validation: Critical System & Device Impact Assessment • Facility Modernization Assessment • Energy Assessment | <ul style="list-style-type: none"> • BSC/Fume Hood Monitoring & Control • Lab Room Monitoring & Control <ul style="list-style-type: none"> • Pressurization • Ventilation • Temperature • Humidity • Lighting • Airflow Control Applications <ul style="list-style-type: none"> • Single Blade Damper Solution • Venturi Air Valve Solution • Indoor Environmental Quality (IEQ) • Utility Submetering • Integration of Critical Devices & Systems • Access/Security • Fire & Life Safety | <ul style="list-style-type: none"> • Real-Time Monitoring • Data Trending • Data Archiving • Reporting • Alarm Information • Remote Notification | <ul style="list-style-type: none"> • Education Services • Calibration Services • Chemical Fume Hood Testing • Bio-Safety Cabinet Certification • Re-entrainment Testing • Room Pressurization Testing • Validation Protocol Development & Execution • Change Control for BAS Updates • Specification Development • SOP Development |
| <p>Assess</p> <p>Regulatory, safety & efficiency issues in facility systems</p> | <p>Monitor/Control</p> <p>Environmental conditions, lighting, access, fire & life safety, utilities, research subsystems/devices & mechanical systems</p> | <p>Manage</p> <p>Total facility operation with monitoring, reporting & data archiving capabilities</p> | <p>Maintain</p> <p>A knowledgeable facility staff, regulatory compliance, operational efficiencies & reliable 24/7 operation</p> |

Assessment Surveys:

Siemens assesses regulatory, safety and efficiency status of your current facility systems.

“Can we really improve safety without sacrificing energy efficiency? I’d like to be able to document that my labs are safe for liability protection. But if there’s a trade-off in energy savings, I’ll have trouble justifying it.”



To help you understand the current conditions of your facility’s building automation systems and to develop a well-targeted tactical plan that addresses your needs, Siemens conducts detailed assessment surveys. We’ll analyze the critical aspects of your operation to identify any potential efficiency, regulatory or safety issues. Our interdisciplinary team will identify existing processes that are working for

you and where new solutions can be integrated for maximum benefit. Areas of concentration include:

- Lab Ventilation and Safety Assessment
- BAS Validation: Critical System & Device Impact Assessment
- Facility Modernization Assessment
- Energy Assessment

These comprehensive assessments not only provide you with a thorough gap analysis or benchmark, but also form the basis for developing a strategic plan that incorporates engineered solutions and information management that will guide you in achieving your facility performance goals.



Engineered Solutions:

Building automation for centralized facility management and control.

At the core of our complete laboratory solution is the APOGEE® Building Automation System, which provides comprehensive monitoring and control capabilities for critical facility conditions. The system's advanced architecture enables integration with third-party BAS components and software to provide excellent opportunities to boost efficiency, lower costs and reduce risks in your facility. With the APOGEE system, you can connect all of your building and research systems, allowing you to monitor, control, plot and report all integrated systems and devices from a single workstation. Its flexible architecture provides the capability to keep pace with changes occurring in the future. Modifications and additions may include both Siemens and 3rd party solutions. The APOGEE automation system also meets electronic record and signature regulations by ensuring the integrity of electronic records throughout

their entire life cycle — from the point of creation to the end of a record’s useful life.

The components of our Engineered Solutions range from small control elements such as sensors, valves and actuators to large, sophisticated automation systems.

Siemens Engineered Solutions include:

- HVAC Controls and Building Automation
- Lab Ventilation and Fume Hood Controls
- Lighting Controls
- Indoor Environmental Quality (IEQ)
- Security and Access Management
- Fire and Life Safety
- Utility Cost Management
- Integration Solutions for Interoperability and Centralized Control

“Research is changing so fast that flexibility in laboratory facility planning and usage is more important now than it has ever been. How can I assure that the system we choose today will be right for tomorrow?”

Fume Hood and Specialty Exhaust Control:

Fume hood control:

The APOGEE system offers Constant Volume, 2-Position Constant Volume, and Variable Air Volume Fume Hood control.

CV: A Constant Volume Fume Hood Controller maintains a constant volume of exhausted air regardless of the size of the face opening or sash configuration.

CV2: The 2-Position Constant Volume Fume Hood Controller maintains one of two selectable and adjustable constant volume flow rates, such as "Occupied" – "Unoccupied".

VAV: The Variable Air Volume (VAV) Fume Hood Controller varies the amount of exhaust air to maintain constant face velocity as the fume hood sash is raised and lowered. The ability to vary the exhaust airflow maintains a safe face velocity regardless of sash position and reduces energy waste.



Fume hood monitoring:

Safety standards (ANSI/AIHA Z9.5, NFPA 45, etc.) and regulatory agencies (U.S. OSHA) require all fume hoods to have a monitoring device to inform the fume hood user as to whether the fume hood is providing safe and proper containment. Siemens offers an Operator Display Panel for use with VAV controlled fume hoods as well as a Fume Hood Monitor for CV systems.

In addition to control for chemical fume hoods, Siemens offers exhaust control applications for biosafety cabinets, snorkels, canopy type hoods and other exhaust containment devices.



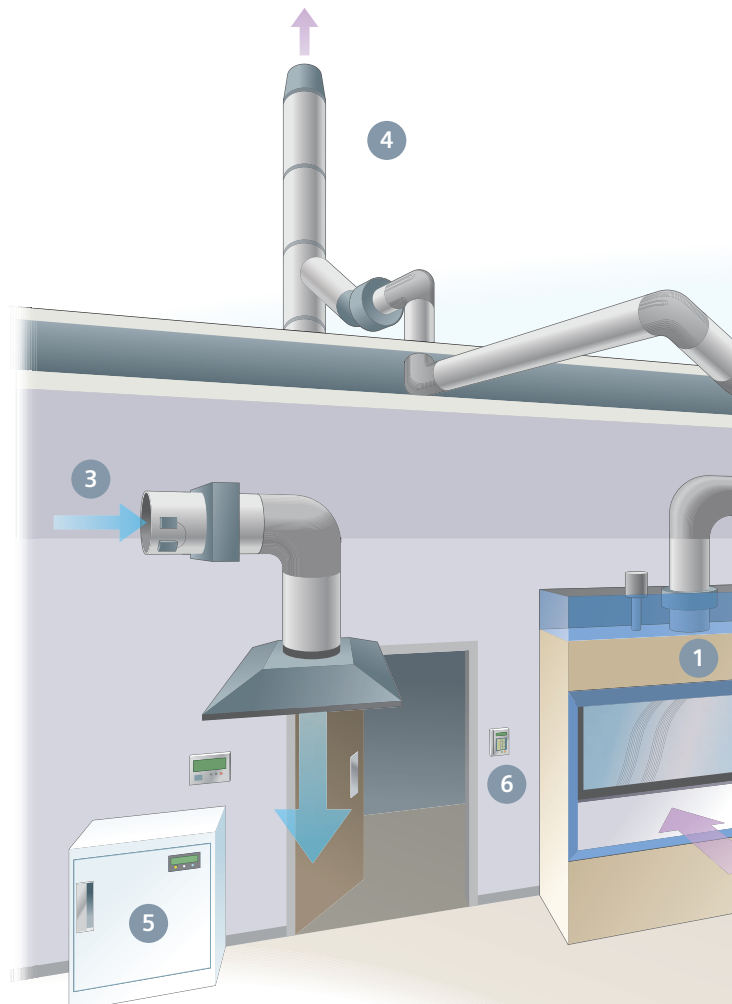
Room Control:

The Lab Controller Module is an independent, stand-alone DDC Controller that controls laboratory room air changes/ventilation, pressure, and environmental conditions including temperature. The controller maintains positive or negative room pressure by continuously measuring room total supply and exhaust and adjusting the flow control device(s) to maintain the user defined differential airflow between the room air supply and total exhaust. Temperature control is provided by measuring the room temperature and controlling the position of the reheat valve and adjusting the airflow.



Pressurization:

In addition to providing the minimum required air changes per hour (ACH) for each laboratory room, a properly designed laboratory ventilation system will maintain the laboratories (as well as any rooms having potentially hazardous or pungent fumes) at a "negative static pressure" with respect to the non-laboratory areas of the facility. Rooms can alternately be positively pressurized to protect the contents from outside contamination.



The APOGEE automation system can maintain desired pressurization and still vary ventilation rates to reduce energy consumption. Ventilation is highest when the room is occupied and chemicals or contaminants are present. Ventilation can be lowered when the room is unoccupied and/or the risk is low.

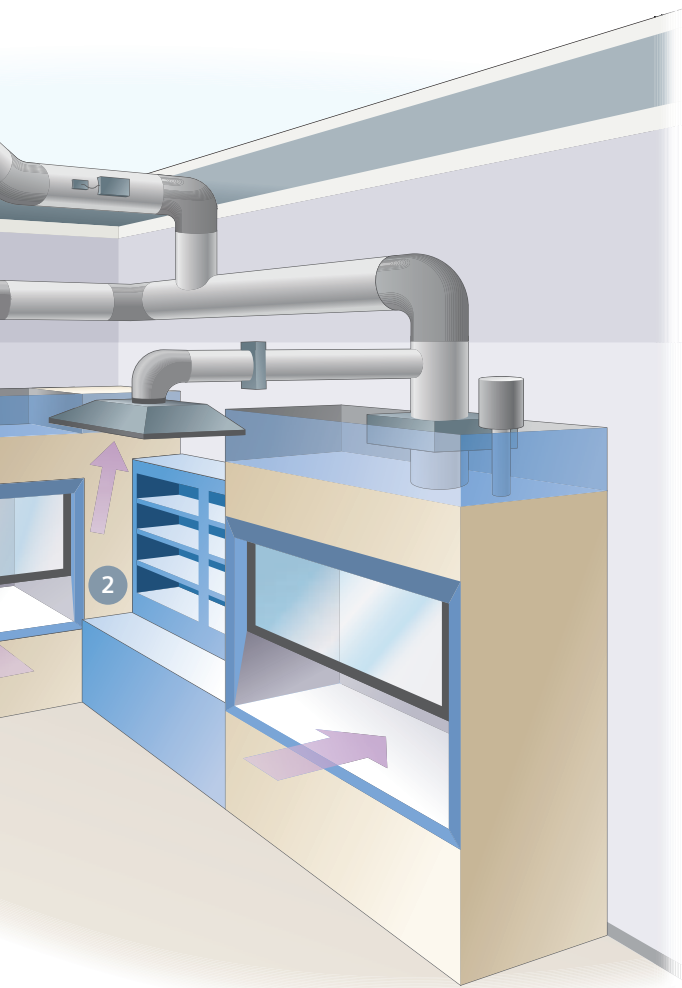
The APOGEE system can maintain pressurization in multiple ways. The majority are controlled through air flow tracking integrated directly to the building automation system. In addition local sensors can monitor and display pressure and provide feedback to the system.

The Differential Pressure Monitor (DPM) measures and displays the differential pressure between a room and its adjoining space.



The Siemens Room Pressure Monitor is an integrated monitor and display unit.





Air Flow Control:

Room supply and exhaust systems work together to maintain desired air changes per hour and pressurization.

The APOGEE Building Automation System offers controls packaged along with either of the leading airflow technologies: Air Flow Terminals or Venturi Air Valves.

Air Flow Terminals are industrial-grade, airflow measurement and control terminal units. They are unique in that they can operate at low pressure and offer cost effective packaging with attenuation and reheat coils.

Venturi Air Valves are pressure independent control terminal units. The Siemens' Venturi Air Valve is uniquely equipped with Siemens' own air flow measuring solution. Actual air flow measurement is critical since air flow is directly related to user safety.

Both technologies provide fast acting, stable and precise laboratory airflow control.



Exhaust System:

The exhaust system is a critical part of a lab area and is unique compared to building systems in non-laboratory areas. It must be designed with the capacity, air velocity, and pressure to reliably collect and transport all hazardous airborne substances (for example, fumes, flammable vapors, airborne pathogens, airborne radioactive particulate, etc.) from the room. The exhaust system must also be designed to prevent re-entrainment and the return of hazardous substances back into the facility.

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Siemens exhaust terminals measure airflow using a unique orifice plate that minimizes pressure loss while maintaining measurement accuracy.

Wireless Solutions:

The flexibility of the APOGEE system offers network solutions that are wired, wireless, or a combination to best meet the needs of the application and facility. Wireless solutions are available for Fume Hood Control, Room Control, and Critical Storage monitoring.



Critical Storage:

The APOGEE system provides the ability to monitor, alarm, report and archive parameters of Critical Storage areas that store vital products and materials. Monitoring possibilities include NIST certified sensors and include both wired and wireless alternatives. Applications include temperature and/or power data for refrigerators, freezers (low and ultra-low), incubators, storage areas, etc.

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Security Solutions:

Siemens offers comprehensive security solutions composed of people, processes and technology. Solutions are designed to adapt as the facilities' needs evolve and include access control, surveillance systems, intrusion detection and perimeter protection systems. As the largest security systems integrator in the US, Siemens provides cost-effective solutions that will allow you to remain safe and see your businesses thrive.

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Fire/Life Safety Solutions:

Siemens solutions include offerings for smoke and fire detection, suppression, and annunciation. Coordination with the laboratory room offers opportunities to automatically start emergency purge or other pre-defined conditions dependent on the specific contents of the room.



Information Management:

Powerful, intuitive access to facility control data.

The APOGEE Building Automation System provides simple, centralized access to facility system information through Insight® Workstations. Facility managers, engineers, scientists and quality control professionals all can access information appropriate to their functions using the APOGEE system.

Information management can be further enhanced with the InfoCenter Suite® solution, a powerful archival and reporting software package.

The InfoCenter Suite solution allows easy management and retrieval of large amounts of historical data. The report management feature provides for creation of reports which can be scheduled and archived for future reference. The InfoCenter Suite solution also provides electronic signatures for authorizing reports, which means your entire process can be electronic with little or no need for paper documents.

Siemens Information Management includes:

- Real-Time Monitoring and Commanding
- Alarm Monitoring and Management
- Remote Notification
- Data Trending and Archiving
- User defined and standard reports
- Access via thin clients, the web and/or terminal services
- Integration with OPC® and BACnet® compliant systems

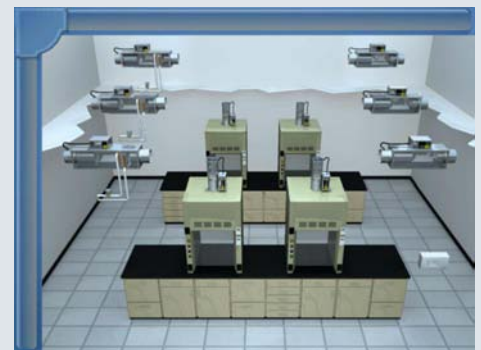
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Operator Access & Privileges

Allow different types of users, from facilities personnel to quality managers to laboratory techs, to access the information relative and appropriate to their tasks. Access to points, reports and other objects and type of privilege such as view only or editing is customizable per user. Access to information may also be limited to specific rooms, floors, or areas.

Dynamic Graphics

Provide an easy view from which to monitor and command the system. Alarms can be monitored and acknowledged and point values overridden from graphics that can include pictures, floor plans, text, and symbols. Links may be added to the graphics such as a PDF of Operations and Maintenance Manuals or internal SOP's associated with the system being viewed.

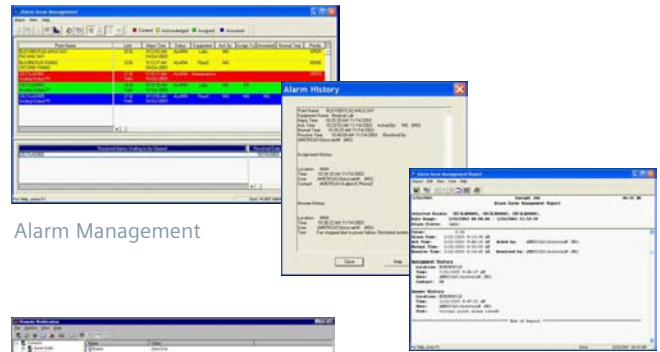


Dynamic Graphics

Alarms

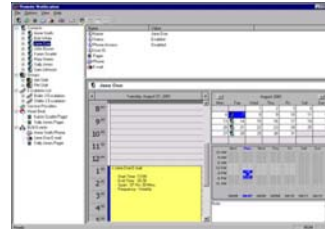
Alarm Management: Allows operators to view and troubleshoot alarms as they occur without disturbing other current tasks. Additional details such as informational text and alarm history are easily accessible. Alarms support “drag and drop” onto other applications such as graphics and dynamic plot for more information.

Alarm Information Management Option: Extends the standard Alarm Management to include documentation of the corrective action taken for each alarm. The application provides an ordered procedure for managing each alarm issue with tasks including acknowledge, assign, answer, resolve, and clear. This option helps meet certain regulations requiring documentation that systems are being maintained. Alarms alone do not ensure that problems were fixed.



Alarm Management

Alarm Information Management Option



Remote Notification Option

Remote Notification Option

Provides annunciation of alarms and system information to pagers, cell phones and email according to schedules and escalation paths.

Compliance Support Option

A technical solution in support of 21 CFR Part 11 compliance. Allows objects to be designated as “supervised” in which case all changes are tracked in an audit trail including the value before and after the change, a reason for the change, and a revision number.



Compliance Support Option

Remote Access

APOGEE GO® Option: Provides the day to day operation of the system including alarm management, graphical monitoring and command, and scheduling using a web browser.

Terminal Services Option: Supports all Insight applications through remote client access to Insight via Windows® Terminal Services over Intranet, Internet, LAN, WAN, low-bandwidth, or dial-up connections.



APOGEE GO Option



Insight Terminal Services Option

Open Platform

The Information Management solution supports communication using standard protocols including BACnet and OPC protocols.

InfoCenter Suite Solution

InfoCenter Administrator® application: Provides a secure means to archive, process, manage, and retrieve business critical data. It is a key component in the APOGEE Compliance Solution. Data is converted into useful information through automated processing, reporting, and analysis.

InfoCenter Report Manager® application: Provides the ability to create report templates that query the InfoCenter Suite database. Templates can be scheduled to generate reports and may contain electronic signatures.



InfoCenter Reports

Service Solutions:

Maintaining established state of control with Siemens.

We can ensure your day-to-day operations are maintained to established standards on a 24/7 basis. Our Service Solutions will help you maintain the state of control needed to meet regulatory requirements, improve operational efficiencies, support a 24/7 operation, ensure immediate recovery and lock-in long-term system performance. With more than 100 field offices across North America, Siemens has local service technicians who are highly experienced and easily accessible to you to provide quality service when you need it.

We offer a full complement of services, including Customer Support, Compliance Services, Facility Information Services and a wide range of Technical Support Services to keep your systems up and running now and in the future.



"We can't afford any downtime in our labs! I want to know if something goes wrong — whether it's this afternoon, next month or three years from now — it will be handled immediately and to our complete satisfaction. Without question.

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Customer Support Services

- Education Services
- Application and Technology Consulting
- Operator Coaching
- Onsite Building Performance Specialist

Facility Information Services

- Environmental Reporting and Consulting
- InfoCenter Suite Custom Report Design and Creation
- InfoCenter Suite System Administration
- InfoCenter Suite User Training
- Data Migration

Technical Support Services

- Automation Controls Analysis and Optimization
- Business Protection and Recovery Services
- Control Loop Analysis and Optimization
- Repair and Replacement Services
- Emergency Onsite Response
- Emergency Online Response
- Network Analysis and Optimization
- Remote Facility Monitoring

Compliance Support Services

- Regulatory Training
- Safety Training
- Consultative Services for BAS Regulatory Compliance
- Specification Writing
- SOP Writing
- Validation
- Change Control for System Updates
- Factory Acceptance Tests (FAT)
- High-Level Commissioning
- GLP Remediation
- Engineering Support
- Chemical Fume Hood Testing
- Biosafety Cabinet Certification
- Re-entrainment Testing
- Room Pressurization Testing

System Performance Updates

- Field Panel Updates
- Firmware Updates
- Software Updates
- Datamate Advanced Software Renewal
- Workstation Updates



Safe:

The safety of people and research is a primary concern in a laboratory environment. Siemens provides safety using multiple systems that can be installed and operated together or individually.

- Proper laboratory room pressurization and ventilation control are absolute requirements for maintaining the health, safety and well being of laboratory facility occupants.
- Securing laboratory areas with door access control prevents unauthorized entrance protecting both the contents of the lab as well as keeping building occupants out of potentially dangerous areas.
- Fire and Life Safety control is designed to protect building occupants and the valuable contents in a research facility.

Flexible:

Siemens offers the variety of solutions and expertise required to properly design, install, and maintain laboratory systems. Siemens also customizes application solutions by working with engineers and consultants to meet the ever changing technologies and needs in these specialized areas. Siemens can provide the complete laboratory management system or only the parts needed to tie into an existing building infrastructure through integration and the use of standard protocols.

Efficient:

Siemens experts can recommend a variety of strategies for the design and operation of efficient laboratories. Strategies may include applying a VAV ventilation system which ensures that only the actual amount of supply air needed is provided and conditioned. This provides a significant opportunity for a facility to minimize energy usage.

Occupied/Unoccupied Modes can also be incorporated into the room control to vary ventilation while still maintaining pressurization. A combination of strategies such as 2-Position Constant Volume fume hood controls, IEQ (Indoor Environmental Quality) monitoring along with VAV room control provide options to balance initial and operating costs.

Siemens is uniquely positioned to provide their own laboratory room level controls, gather the room level data and incorporate it into building/system wide energy saving applications.

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Manager, and InfoCenter
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