

# Dow Europe GmbH, Horgen (CH)

Increased energy efficiency and safety in a laboratory thanks to an integrated building automation solution



Dow is one of the largest chemical companies in the world – with headquarters in Midland/USA and Horgen in Switzerland. It is one of the leading companies in the area of research and technology for chemicals, plastics, and agricultural products for the entire world.

#### ■ Safety for personnel and environment

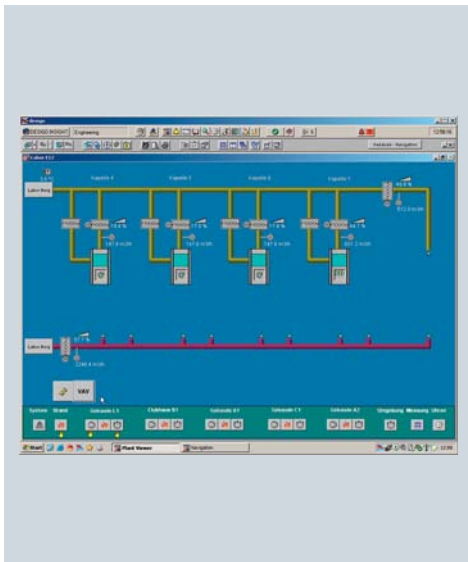
The research facility in Horgen is continually expanded. At all times, safety for personnel and environment comes first. Regarding energy efficiency, Dow has also always been the class winner. Because next to safety for employees, a comfortable climate according to economic and ecologic aspects is also very important for the company. With its new laboratories, these goals shouldn't only be met, but improved and outmatched.

#### ■ A reliable partnership

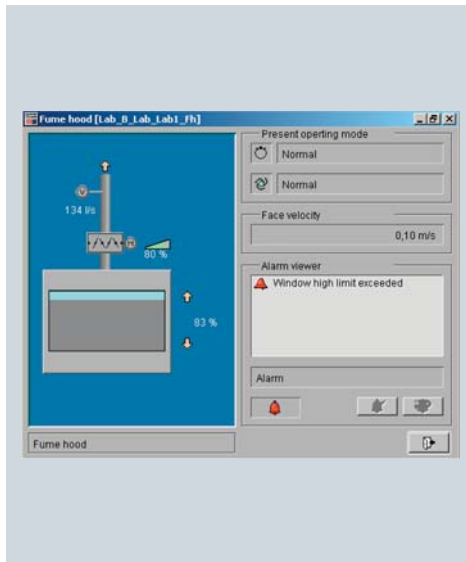
Since many years, there's a close partnership between Dow and Siemens Building Technologies. The main research facilities from Dow – for example Freeport/USA, Midland/USA, Shanghai/China, and Horgen/Switzerland – are already equipped with technology from Siemens. Dow appreciates the high-quality products from Siemens and the fact that they receive everything from one source.

#### ■ Fully integrated laboratory solution

Siemens was once again partner of choice to equip the new laboratories in Horgen with an integrated laboratory solution, including everything from the fume hood controller to the entire building automation system with specific functions for the entire laboratory. The laboratory solution excels through simple operation, high reliability, easy expandability, and high flexibility. Moreover, it increases safety as well as comfort and optimizes the efficiency of the building at the same time. The laboratory solution from Siemens complies with the European Norm EN 14175 or the Swiss Norm SN EN 14175 respectively, independent of the fume hood manufacturer.



The building management system provides a central overview of all fume hoods.



Visualization of a fume hood



Fume hoods at Dow Europe in Horgen, Switzerland

# Automated fume hoods increase energy efficiency

The fume hood in a laboratory is an essential protection device. Through targeted air flow or aspiration it ensures that no explosive concentrations develop and no contaminated air can flow back into the laboratory – whether the sash is open or closed. This is why fume hoods are usually a source of high energy consumption. Dow Europe wanted an energy-efficient fume hood solution.

## Dynamic volume flow for the fume hood

To increase the energy efficiency of the installed fume hoods, Siemens came up with an effective and comfortable solution: a dynamic adaptation of the volume flow to the current position of the sash. Because if the sash is closed (up to a minimal opening of 15 mm), a lower volume flow is needed to ensure safety than if the sash is open – saving both energy and costs.

Siemens installed sensors that permanently monitor the volume flow. Moreover, they identify the position of the sash and define the set point for the volume flow accordingly. This happens so fast that the control system can dynamically adapt the volume flow before contaminated air can leak when the sash is opened. When the sash is closed again, the volume flow will be automatically reduced again.

## Integrated safety

The tested laboratory fume hood control unit includes all needed components such as a volume flow controller with a measuring device, an actuator as well as sensors. The intelligence is integrated in an autarkic automation station that communicates with the room unit and the building automation system via a standard LON® interface. If the sensors detect a deviation from a predefined condition, they trigger an acoustic and optic alarm locally as well as at the central building automation station.

## Innovative fume hood control unit

For local control right at the fume hood, every fume hood was equipped with a laboratory control unit HLM10.1 from Siemens, which supports both acoustic and optic alarming. Thanks to an integrated danger management system, alarms can also be triggered from any-

where in the system. This means that if danger is detected at one point, all connected fume hoods are alarmed at the same time – no matter where they are located.

In addition, the set points for the volume flow include:

- up to 5 different operation modes
- fume hood not in use
- fume hood is controlled by sash

The button “night experiment” avoids that the fume hood used is shut down centrally by a night mode.



A laboratory with variable volume flows at Dow Europe in Horgen



**Christoph Fröhlich**  
Facility Manager,  
Dow Europe GmbH,  
Horgen, Switzerland

“The possibility to fully integrate the laboratory solution into our existing DESIGO building automation system convinced us that this is an ideal solution for us. Our building management personnel benefits because they have to master only one system. And being able to recognize a ventilation problem in a laboratory located in another building saves many long ways and enables quick reactions. The cooperation with Siemens was great, and their consulting always customer-oriented. In urgent cases, components were even specially produced right away and quickly delivered.”

## Increasing room comfort in the laboratory

A laboratory is a highly complex environment. For its new laboratories, Dow Europe wanted a solution that provides a comfortable work environment for its employees. At the same time, the solution had to be energy-efficient and easy-to-operate.

### ■ Comfortable room conditions

At Dow Europe, every fume hood is operated with a volume flow between 150 – 600 m<sup>3</sup>/h, depending on the operating mode and the position of the sash. To ensure a minimum air exchange rate and air circulation in the laboratory, the room exhaust air is controlled variably.

### ■ Autarkic volume flow control

The laboratory offers dynamic volume flow control to ensure it can be quickly and precisely adapted to the changing requirements of the fume hoods. For each laboratory, there is an individual balancing of required supply and exhaust air, where also localized extraction with constant volume flow is considered. This includes also the option for room pressure control. Each volume flow unit was equipped with an independent control unit, which allows maximum flexibility. Whenever the room requirements will change, it will cause only the adaptation of software configuration.

### ■ Integrated information exchange

The intelligence of the control unit is integrated in an autarkic automation station that communicates via a standard LON interface. This enables the room controller to exchange information with

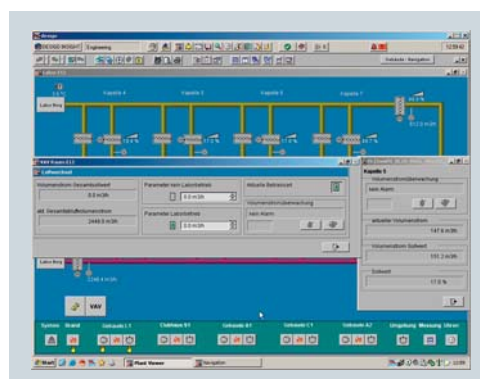
the connected fume hood controllers and to include their information in its calculations. Thus, a very stable volume flow control in the laboratory rooms can be achieved as well as comfortable room conditions – very energy-efficiently.

The software applications of the room control includes the following standard functionalities that were adapted to the on-site requirements with only little parameterization effort:

- Volume flow control of exhaust or supply air
- Automatic calibration of the pressure sensor

- Monitoring of the room air exchange
- Dual addition of up to 16 volume flow signals
- Room pressure control
- Set point setting via LON-bus, digital inputs, occupancy or via addition
- Master/slave control of multiple volume flow controls
- Monitoring of volume flows, alarming via LON-bus and relays
- Digital inputs for set point setting and emergency function
- Emergency operations: fire, emergency locking, flushing, emergency under- and overpressure

The standard communication interface allows reliable and comprehensive monitoring.



Autarkic room volume flow control at Dow Europe in Horgen





Prof. Kurt Hildebrand,  
long-time consultant for  
Dow Europe

"An integrated solution means clear connecting lines managed by building automation and control. Building operation and management becomes possible via the shortest paths for automation, control and, as needed, intervention; in other words, quickly, safely and, above all, understandable. Moreover, fewer 'connecting elements' for the individual units are required for hardware and software."

# A comprehensive laboratory solution

Since many years, Dow Europe in Horgen has been setting standards regarding safety and energy efficiency.

## ■ A new standard

Deciding for the laboratory solution from Siemens, Dow Europe set yet further standards – with the dynamic monitoring and control of its new fume hoods, the precise room control as well as the efficient operation of the plants. Operators especially appreciate its seamless integration into the building management system because it guarantees a high level of safety, quick intervention in case of an event and continuous optimization of the plants.

## ■ Expertise from one source

Dow Europe received everything from the fume hoods to the laboratory control, primary plant control as well as the comprehensive visualization within a building management system from one source – Siemens. Thanks to tested single units and standardized communication interfaces, the project could be realized in a short period of time and with the quality Siemens is known for.

## Highlights

- Fully compliant laboratory solution according to EN 14175/SN EN 14175
- Increased safety due to dynamic volume flow adaptation
- Improved energy efficiency and comfort with demand-driven volume flow control
- Optimized operation efficiency and transparency based on complete integration in the building management and control system
- One competent single source for the entire laboratory environment during realization and on-going operation

The information in this document contains general descriptions of technical options available, which do not always have to be present in individual cases. The required features should therefore be specified in each individual case at the time of closing the contract.

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