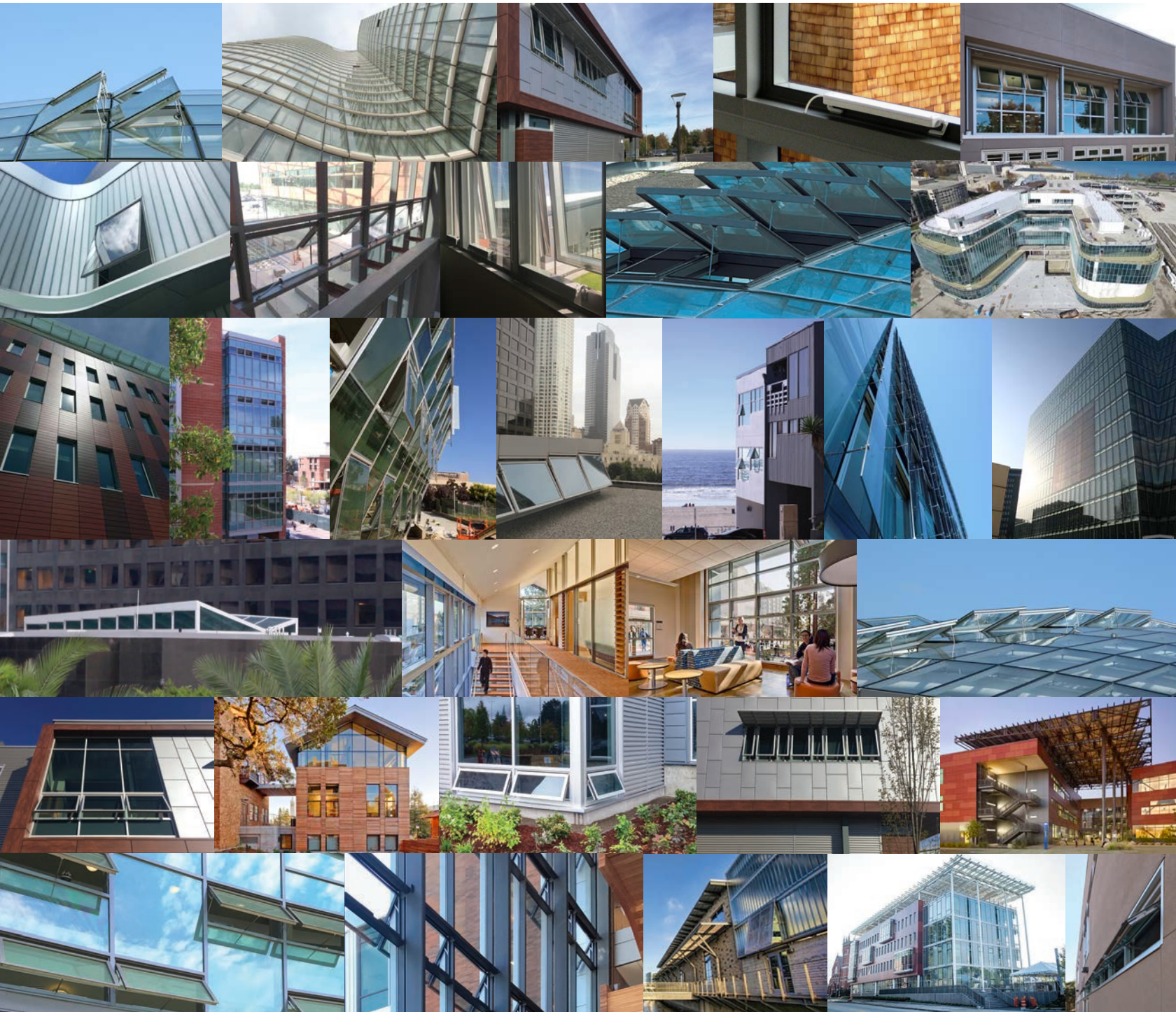
Automated Fenestration Inc.

North America's leader in window and door automation

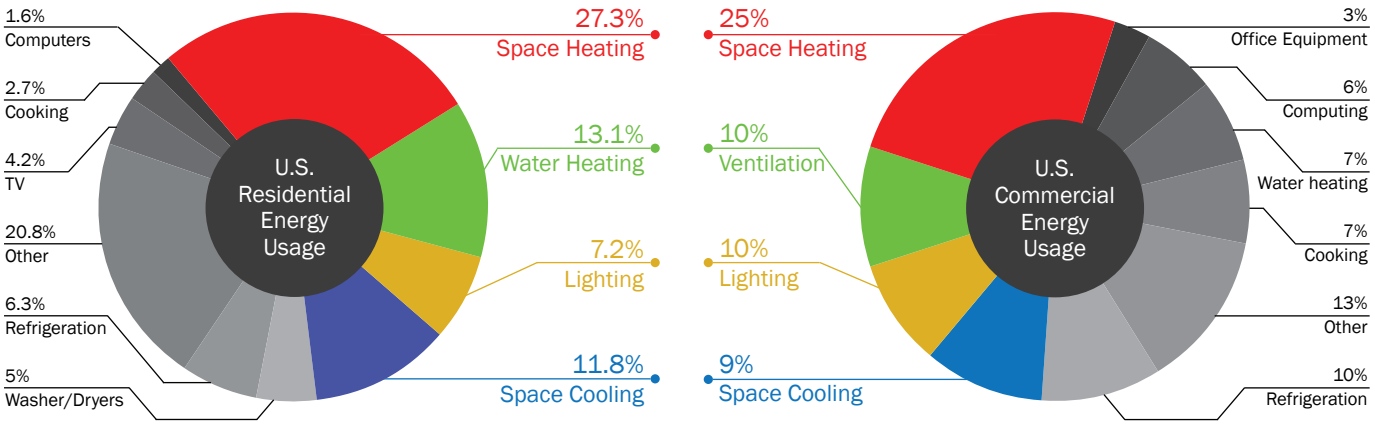


Natural Ventilation Benefits

Lower Energy Use

About 40% of the current U.S. energy consumption is in residential and commercial buildings. Heating, cooling, and lighting are the largest energy users in most buildings - combined these 3 use nearly 50% of the power.[1]
Natural ventilation reduces a building's environmental impact in all three areas. Natural daylight from windows and skylights reduces the need for artificial lighting. Natural ventilation reduces reliance on HVAC (Heating, Ventilation and Air Conditioning) systems. Lower demand for energy reduces CO2 production. This is why natural ventilation qualifies for LEED credits under Indoor Environmental Quality for Natural Ventilation, Daylighting and Views. The benefits of daylight, fresh air and views have also been shown to improve morale and performance for students and employees.

[1] U.S. Energy Information Administration



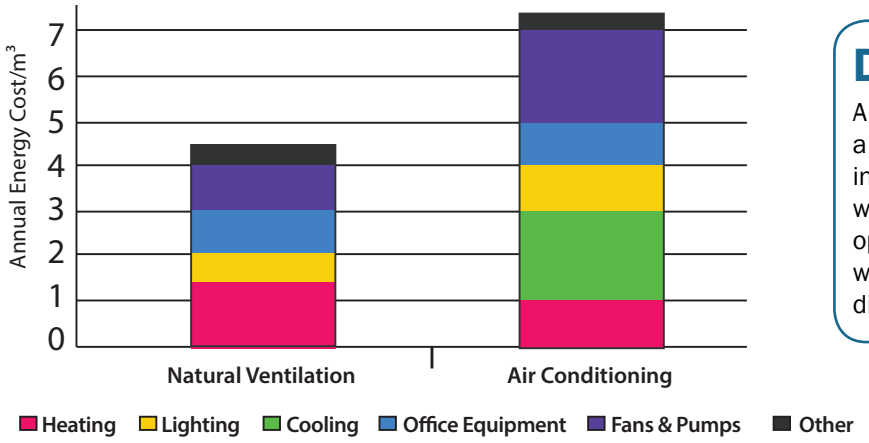
Greater Safety

During a fire, a building with an intelligent natural ventilation system can release smoke and heat to give rescuers and occupants more time to save lives. In Europe, SHE (Smoke & Heat Extraction) systems are becoming the best practice. All AFI Actuators are SHE certified.

Ventilation on demand

Lower operating costs of a building by reduced energy consumption
Lower maintenance costs (approx. 30% of mechanical a/c, 20% of climatization)

Energy efficiency by "intelligent" windows



Quelle: CIBSE Good Practice Guide 237

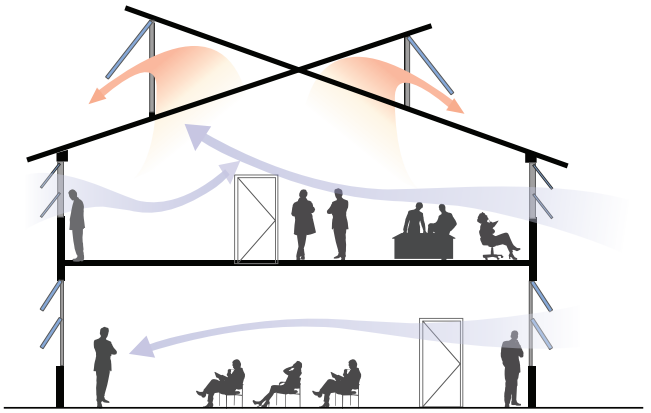
Design Considerations

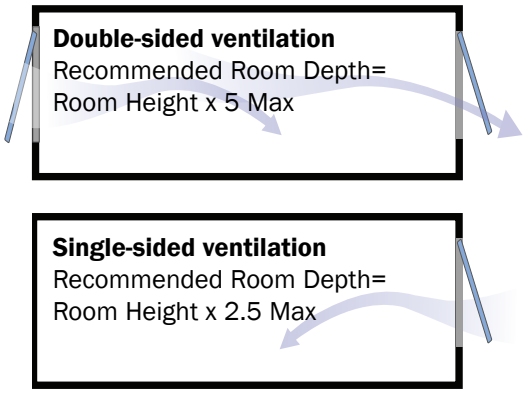
A natural ventilation system works well in a wide range of buildings when the design incorporates: when to close windows for weather and security, what size and height of openings will achieve optimal airflow rates, which window type will result in desired direction of airflow.

Ventilation Types

Mixed-Mode (Hybrid) Ventilation

Mixed-mode (hybrid) systems combine both natural and mechanical (HVAC) systems.
Mixed-mode can maximize energy efficiency and occupant comfort when thoughtfully designed to efficiently change between modes, ideally with a Building Management System.



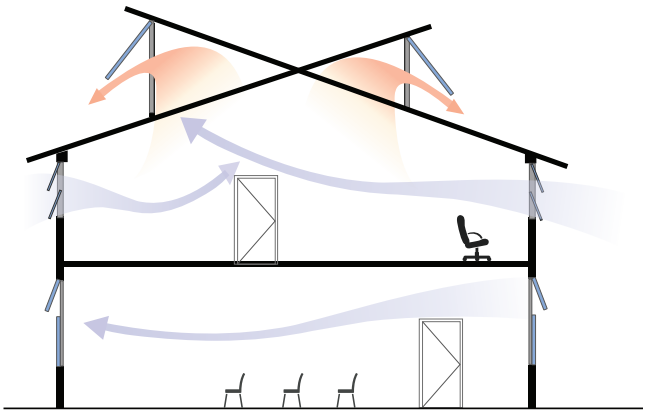


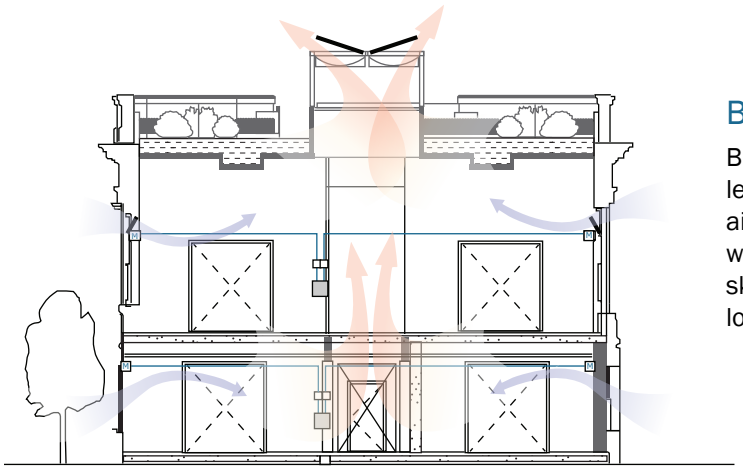
Wind-Driven Ventilation

Wind-driven ventilation takes advantage of positive pressure on the windward side of a building and negative pressure on the leeward side. Fresh air enters a windward opening and exits through a leeward opening, thus equalizing pressure. When a building has windows on one side, maximize single-sided ventilation by limiting the room depth to two-and-a-half times the clear height of the room. When a building has windows on two or more facades, maximize cross-ventilation by limiting the room depth to five times the clear height of the room.

Night Ventilation

Night ventilation uses buoyancy to benefit from cooler nighttime temperatures. Opening windows at night flushes accumulated daytime heat, and replaces it with cooler night air, preparing the building for the next day. A building management system can monitor the temperature so that when a chosen temperature is reached, the windows close. Night ventilation can provide up to four times the cooling capacity of daytime cooling.





Buoyancy-Driven (Stack-Driven) Ventilation

Buoyancy takes advantage of the fact that warmer air is less dense and will naturally rise up above cooler denser air. A stack-driven ventilation design directs buoyant warm air to upper and roof areas, and exhausts it out via skylights and windows, while drawing in cooler air through lower level openings.

Opening Types

Operable Skylights

Operable skylights or vents allow hot air that rises to the ceiling level to be effectively exhausted from the space. Automated skylight venting typically utilizes buoyancy-driven ventilation.

Awning Windows (Top Hinged)

Awning windows consist of several top hinged sections arranged in a vertical series, operated by one or more control devices that swing the bottom edges of the sections outward. They are designed to admit air while excluding rain.
Awning window venting can be used on any building and is the most popular application in America.

Hopper Windows (Bottom Hinged)

An inward-swinging sash is known as a hopper window. The opening is usually restricted by a side hinge, stay arm, or actuator setting. Hopper windows are utilized on education and institutional buildings. Hoppers windows provide optimal airflow and are the most popular style in Europe.

Opening Types

Parallel-Projecting Windows

Parallel-projecting windows are used to retain the visual effect and appearance of a glass facade even when the windows are opened. The window surface is moved out in an orientation that is parallel to the glass facade.
This opening method is also suitable for achieving natural ventilation because parallel-projecting windows can obtain a much higher rate of air exchange with the same opening width.

Casment Windows (Side Hinged)

These automated, side hinged casement windows can be hinged right or left and swing inward or outward.

Retrofit Windows

For retrofit onto windows with exisitng manual operators. Typically used on casement windows and light skylights, these motors can be wired together with multiple motors.

Control Panels

What's a control panel?

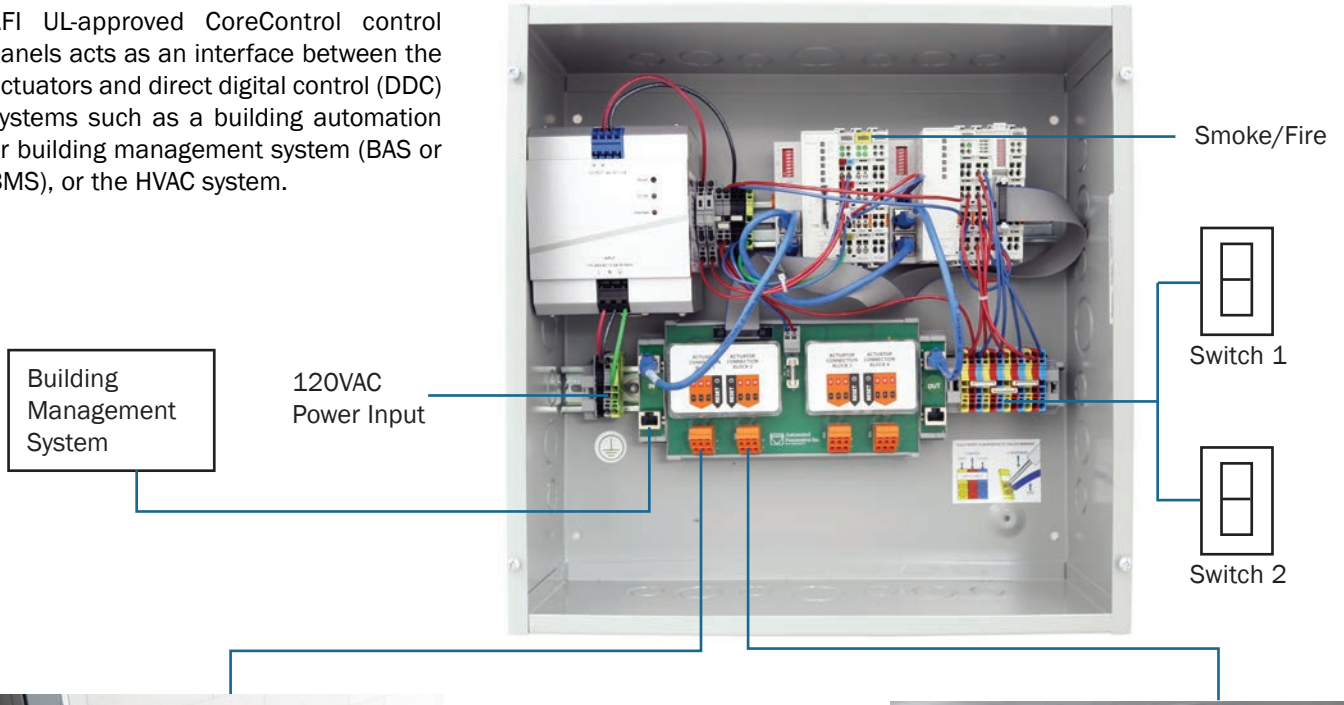
Two-way communication is used for the following:

- Smoke & fire
- Wind & rain
- Security (open window indication)
- Exact opening position
- CO2 levels
- Schedule of opening and closing
- Speed of opening

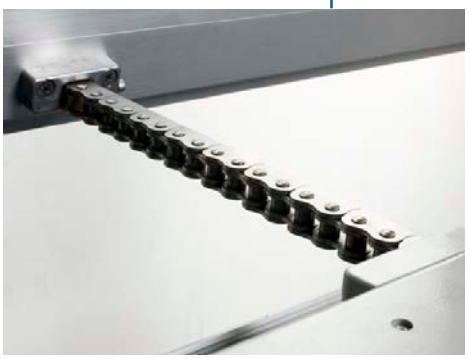
How it works

AFI Actuators and CoreControl panels work together to facilitate optimal natural ventilation. Automated windows are controlled by the building management system in conjunction with scheduled or unscheduled events.

AFI UL-approved CoreControl control panels acts as an interface between the actuators and direct digital control (DDC) systems such as a building automation or building management system (BAS or BMS), or the HVAC system.



Window Actuator



Window Actuator

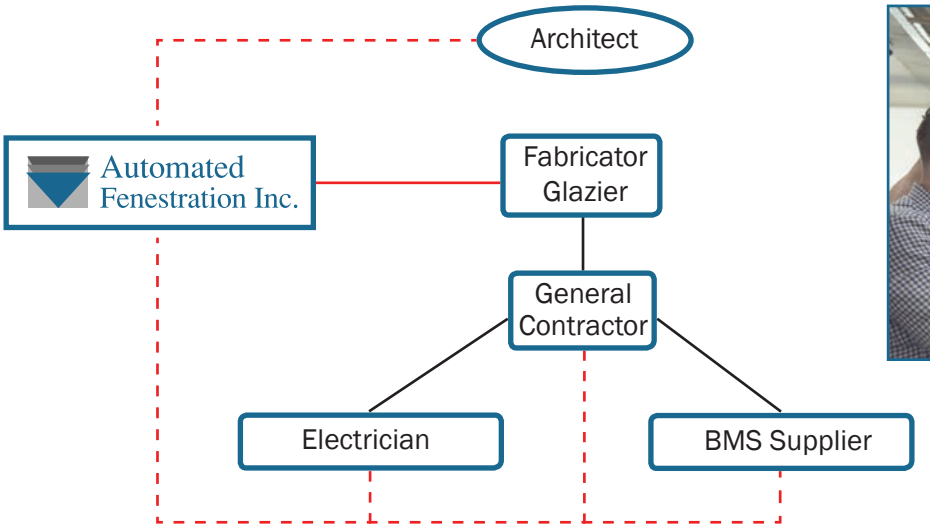
Actuators

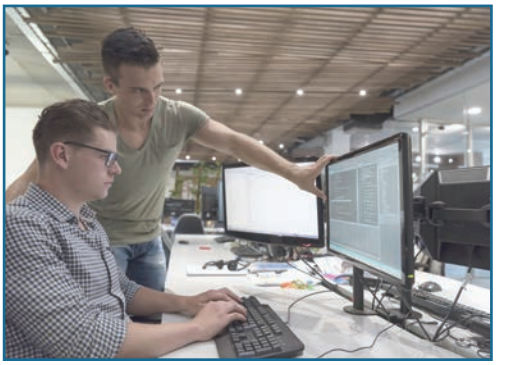
Actuators are available in either 120V AC line voltage or 24V DC low voltage for various applications. Speed control allows slower, quieter operation for automatic opening, especially useful when the building is occupied. Faster operation is important in emergencies, e.g., for smoke ventilation. A wide range of mounting brackets are used to allow full movement of the actuator. Actuators are commonly available in custom powder coated finishes to match the curtainwall.
UL Listed actuators and control panels provide hassle-free inspections.

Chain Actuators

Chain operation is the most common type of actuator for automated fenestration. The chain is extended by means of an electric motor which rotates the sprocket driving the chain. Chain lengths are available in a variety of standard lengths, and some actuators feature programmable chain lengths. For corrosion resistance, a stainless steel chain is preferred.

Experience in the field





Partners in the field

SCHÜCO

FLEETWOOD WINDOWS & DOORS

Kingspan Light+Air

arcadia

TRÜ ARCHITECTURAL

Pella

KOLBE WINDOWS & DOORS

WAUSAU WINDOW AND WALL SYSTEMS

TAGG THE ARCHITECTURAL GLASS GROUP

Skyco SKYLIGHTS

QUANTUM WINDOWS & DOORS

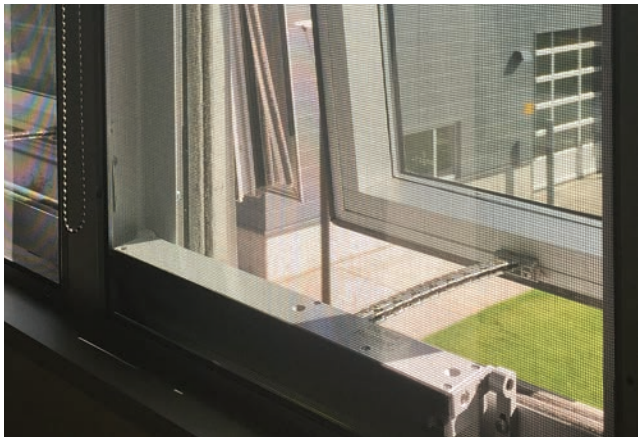
c UL us LISTED

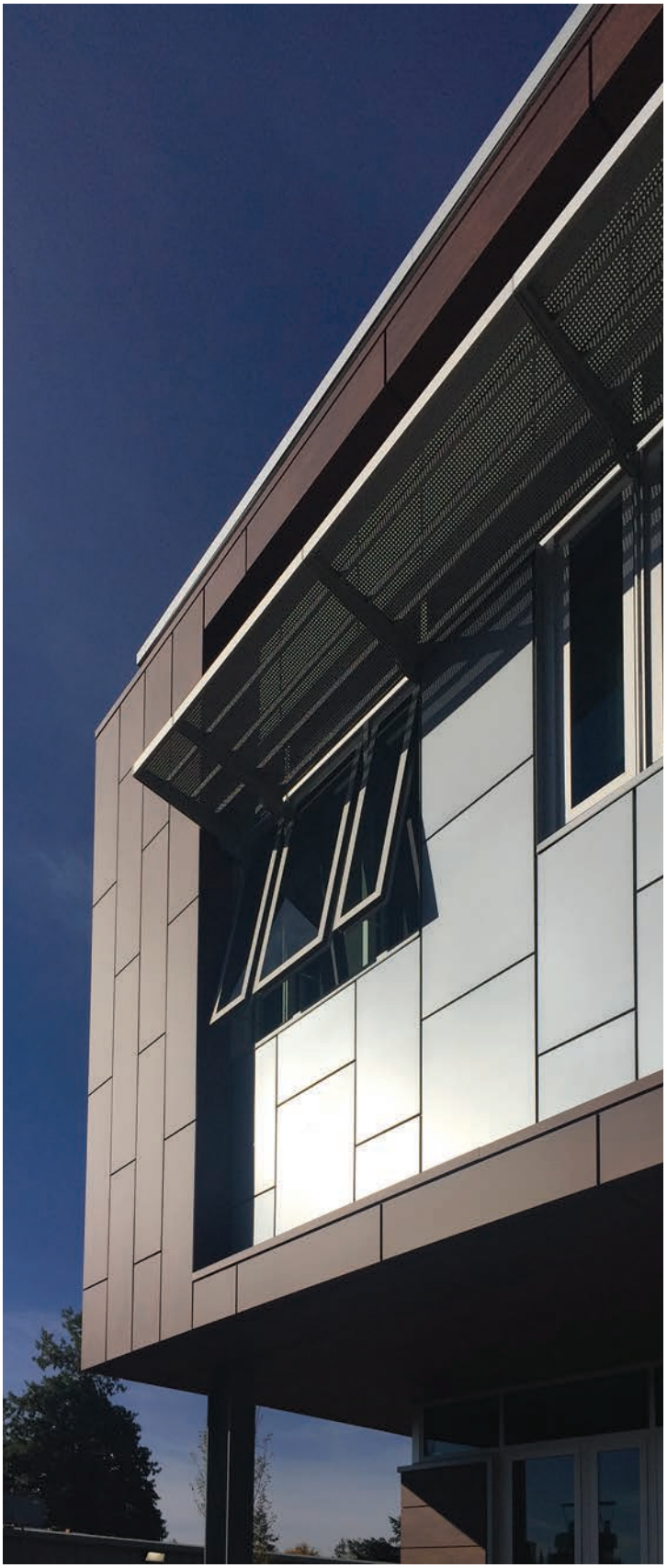
AFI offers UL listed actuators and control panels for natural ventilation projects for windows and skylights.

U.S. GREEN BUILDING COUNCIL LEED USGBC

LEED credits for green building projects can be earned under Indoor Environmental Quality for Natural Ventilation, Daylighting and Views.
Contact AFI during the project design phase, for technical expertise in choosing a correct system, help with system layout, and budgeting advice.

Chemeketa Community College





Project

Chemeketa Community College

Machining and Engineering Building

Salem, OR

Architect

Carlson Veit Architects

Products

LM2 Chain Actuators

Glazing Co.

Encore Glass

Laurel School Upper Campus

Project

Laurel School Upper Campus

Menlo Park, CA

Architect

DLM Architecture

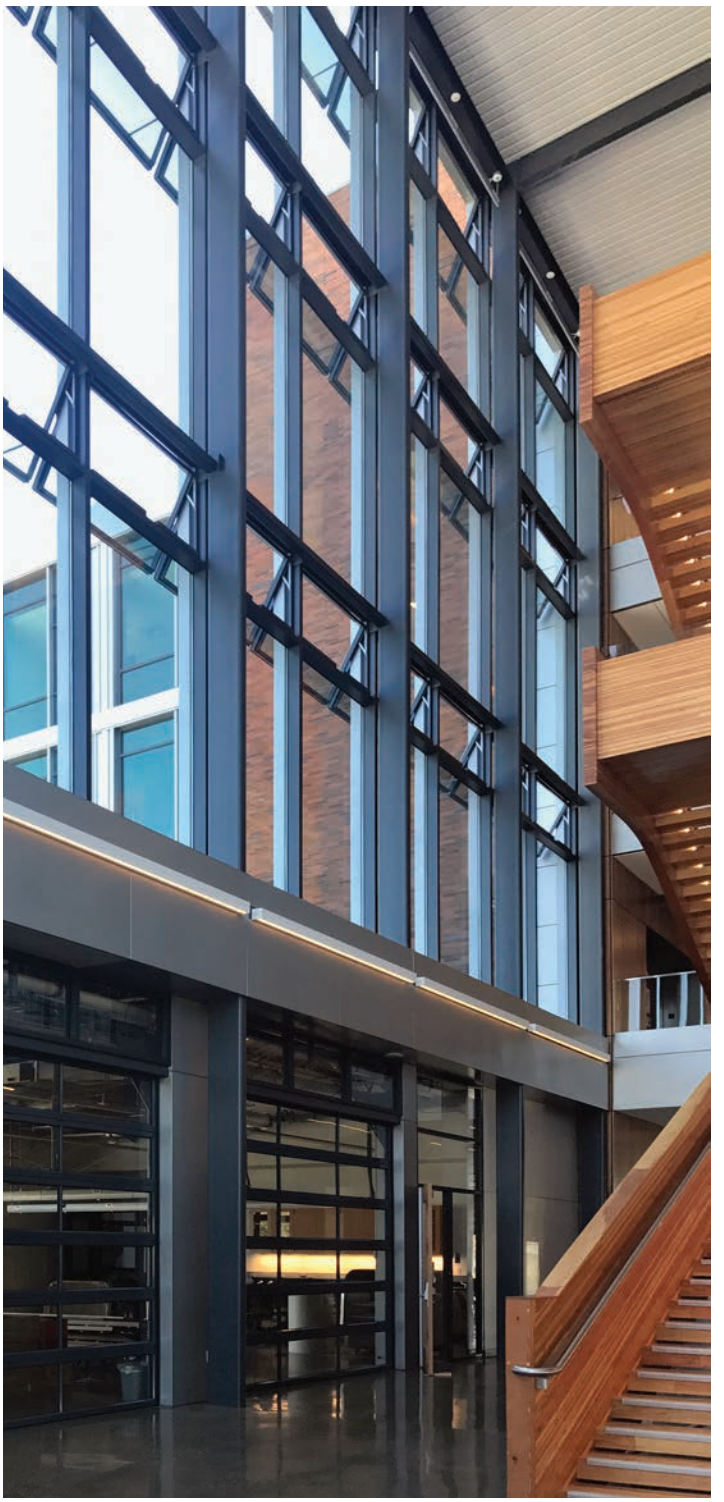
Products

EM Chain Actuators

Glazing Co.

Montez Glass Inc.

Everett University Center



Project

Everett University Center

Washington State University

Architect

SRG Partnership Inc.

Products

EM & EM Tandem Chain Actuators

Glazing Co.

Kenco Construction

LA Mission College

Project

LA Mission College - CMS Building

Sylmar, CA

Architect

Quatro Design

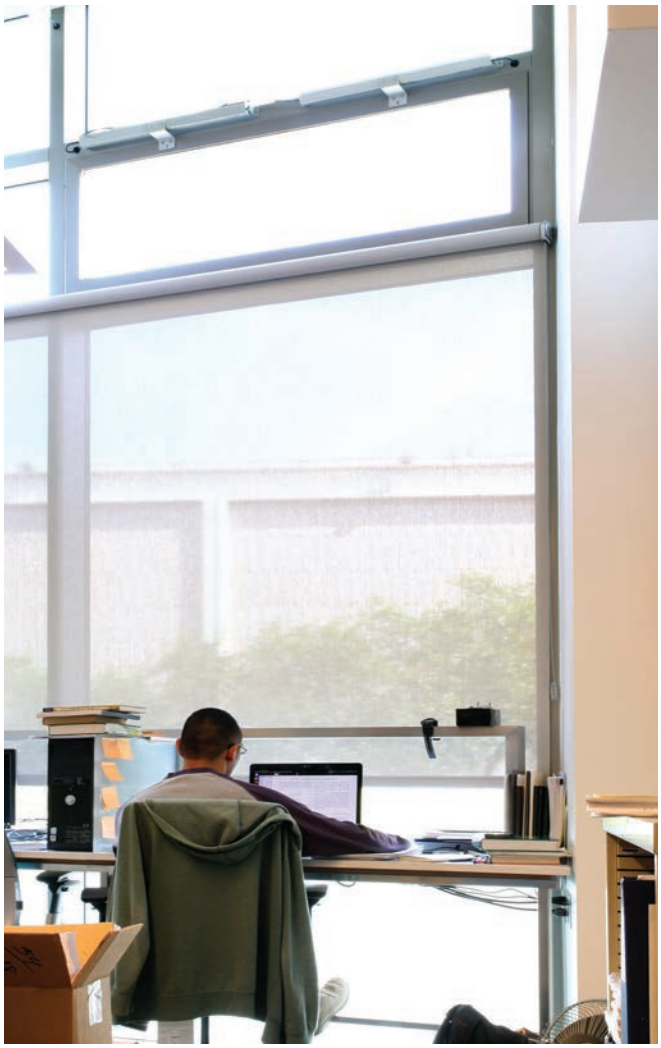
Products

EM Chain Actuators

Glazing Co.

Marc Anthony Glazing

UCLA Engineering Building



Project

UCLA Engineering Building - Phase I

Los Angeles, CA

Architect

Moore Ruble Yudell Architects

Products

EM Chain Actuators

Glazing Co.

Arcadia Glazing

University of Iowa

Project

University of Iowa - Visual Arts Building

Iowa City, IA

Architect

Steven Holl Architects

Products

EM Tandem Chain Actuators

Glazing Co.

Alliance Glazing