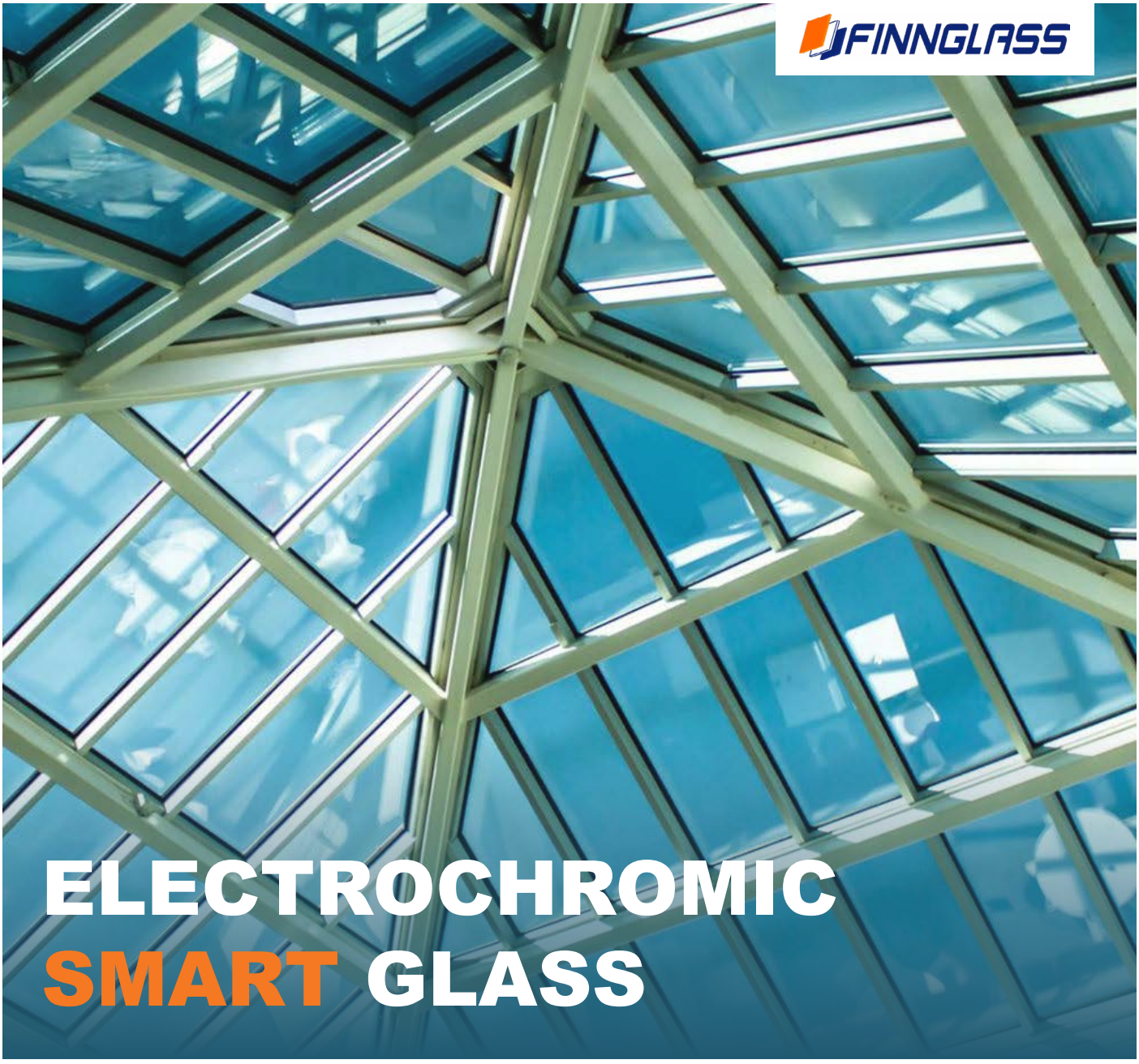


ELECTROCHROMIC SMART GLASS

CONTROL PANEL

Control mode

Automatic — Manual

Light transmission*

14% — 56%

Solar heat (G-value)*

0.10 — 0.35

Control sunlight and solar heat.

Reacts to temperature changes, climate conditions and user preferences to keep cool in the summer and warm in the winter.

*Triple-glazed window with Electrochromatic Smart Glass 21 – 16 argon – 6 low-E – 16 argon – 6 low-E
Photo: Fabege AB, Office building, Grand Central Sundbyberg, Sweden

Photo: IHUS, Office Building, Uppsala, Sweden

BENEFITS

SOLAR CONTROL

Changes in tint are smooth and subtle and happen automatically or on demand to keep light and heat causing solar radiation in check. Program windows to react to weather, season or time of day.

QUALITY THAT LASTS

This technology combines roughly 30 years of trailblazing research into electrochromic coatings with local universities and unparalleled experience in installing electric parts to glass structures. All electrical parts are certified for health and safety, and work even in cold climates.

UNOBSTRUCTED VIEW & DESIGN

Windows let in just the right amount of daylight without compromising transparency. The tinted state is an even, neutral shade of gray that can easily be paired with any architectural desing. Enjoy your view and clean architectural look without blinds or shades.

INDOOR COMFORT

Feel comfortable and enjoy the views without being dazzled by glare and sunlight. Sunrays feel cool on skin even next to a big window on a hot and sunny summer day. The solution's PVB film blocks UV rays, which prevents interiors from fading and turning yellow.

ENERGY EFFICIENCY

Tackle temperature control where unwanted heat loss and gain happens – your windows. In the summer, Smart Glass prevents solar heat from getting in, reducing the need for air conditioning. In the winter, solar radiation is let in to benefit from heat gain. Smart Glass uses electricity only when changing tint, and no electricity is needed to maintain a tinted state. The energy efficient nature of our solution goes a long way in helping you aquire a LEED, BREEAM or Green Building Certification.

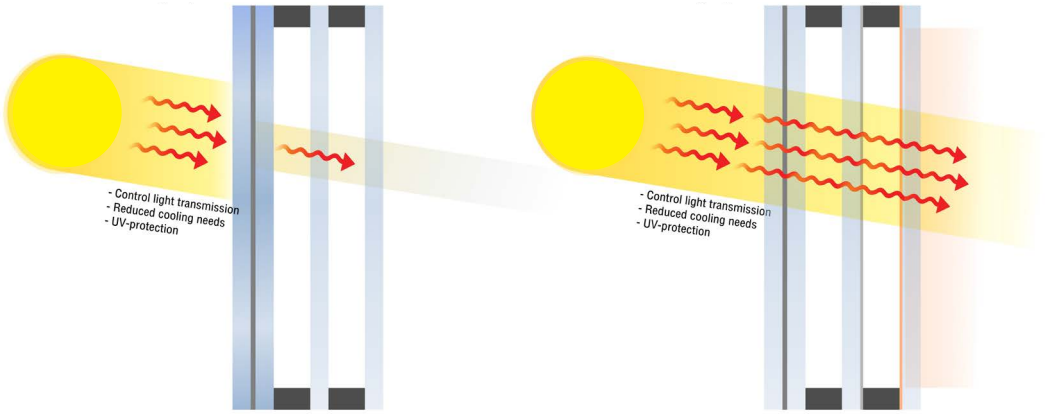
TECHNOLOGY IN BRIEF

Electrochromism refers to the use of electricity to change color or tint. Our electrochromic coating enabling tinting is based on sputter-deposited tungsten oxide. It is applied to a PET foil, then installed between PVB films and two glass panes. The edges of the glass panes have electrode strips that lead electric current from a highly flexible double insulated cable to the coating.

When low electrical voltage is passed through the coating, ions move between layers, changing optical and solar radiation properties of glass. Power consumption is 1 W/m^2 when changing tint, 0.05 W/m^2 on average, and 0 W/m^2 at standby. Wires are hidden in window frames, making it easy to install Smart Glass even in moving glass panes, such as sliding glass doors or casement windows. Electrodes are installed in the black-off area, and are therefore not seen through the visible area.

Properties of glass can be controlled from our wall-mounted control unit. It is also possible to integrate Smart Glass with most Building Automation and Management Systems (BAS/BMS) available in the market. Glass panes come in sizes up to 1.57 m x 4.4 m. Other sizes, as well as curved and shaped glass (triangle, cylinder, parallelogram etc.) are available on request.

Glass construction and thickness (mm)		**Daylight**						**Energy U_g** U-value W/m^{2}K
		Light transmission, %		G-value / solar factor		R_a-index		
		Light	Dark	Light	Dark	Light	Dark	
Single-glazed	21	67	17	0.66	0.55	90	90	5.0
Double-glazed	43	61	15	0.41	0.14	90	90	1.0
Triple-glazed	65	56	14	0.35	0.10	90	89	0.5



Electrochromic Smart Glass

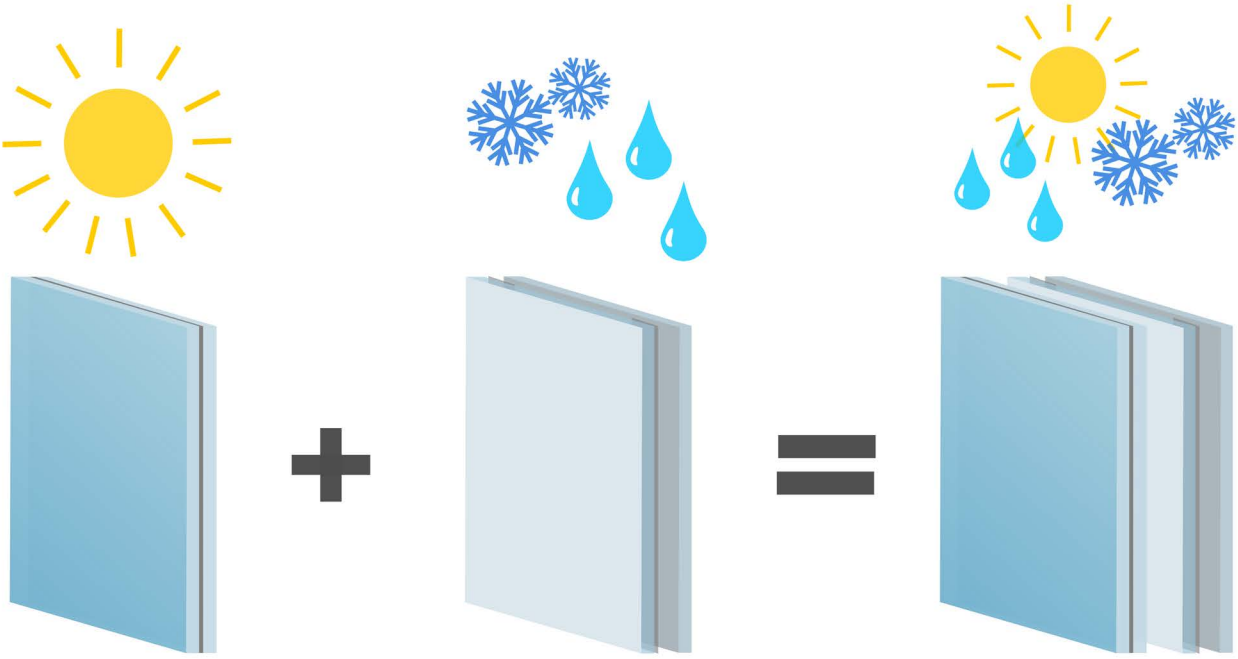
A 0.4 mm PET foil with electrochromic coatings is installed between two 0.8 mm PVB/SGP interlayers and two glass panes. Together they block sunlight and solar heat from getting indoors. The illustration above shows a triple-glazed window, however, single, double and even quadruple-glazed windows are available too.

Combine with other technologies

Combine Electrochromic Smart Glass with our other products to meet any combination of requirements. Here it is combined with Electrically Heated Glass to provide comfort anywhere from the arctic cold to tropical humidity. Heated coating can be installed on inner glass, outer glass, or both, to achieve desired comfort. Read more on next page.

ONE SOLUTION FOR ALL CONDITIONS

Combine Electrochromic Smart Glass with our Electrically Heated Glass to achieve the ultimate climate control suitable for all weather conditions. The globally recognized research conducted to innovate these products have made significant scientific contributions to both technologies, which we have packaged to offer the most advanced window-based climate control solution in the market.



Electrochromic Smart Glass

Activates in warm and sunny weather. In the summer, blocks sunlight and prevents glare and solar heat radiation (high R-value). In the winter, it blocks glare, but allows light and solar heat for energy efficiency.

Electrically Heated Glass

Activates in cold, snowy, icy and humid conditions. Heating installed on exterior glass prevents condensation, ice formation and snow build-up. Heating on interior glass prevents convection, cold-wall effect and draft (low U-value).

One solution for all weather conditions

By combining Electrochromic Smart Glass with Electrically Heated Glass, we can meet any requirements (R and U-value) for your comfort and well-being. Smart Glass blocks up to 90 % of solar radiation and 66 % of light, but even higher levels can be achieved through different product combinations.

About Finnglass

Finnglass has over 30 years of experience in developing and manufacturing specialty glass for structural glass facades and window solutions. Electrochromic Smart Glass is a result of decades of research and collaboration by the Ångström laboratory, Uppsala University and its high-tech spin-off, ChromoGenics, in Sweden. Finnglass developed Electrically Heated Glass, also in collaboration with local Universities, in Finland. Our products are based on quality and highly appreciated by clients, such as leading glass and metal contractors around the world.

Visit us at www.finnglass.com.