

Clariti

LET'S TALK GLASS



Dear Readers,

I am immensely pleased to bring to you another issue of Clariti, which has been well-received since its inception last year.

Every issue of Clariti explores some exciting trends and developments in the world of glass. This time, the **Cover Story** focuses on **Smart Glazing** which is revolutionising architecture and interior design. The union of glass with cutting-edge technology is creating new products, new designs, and never-before possibilities. The **Case Study** showcases how building design can affect glazing requirements, as an institute in Mumbai achieved the desired energy efficiency even with relaxed glass values due to its optimal design.

The section **Eye Catcher** presents an AIS VUE (uPVC Doors & Windows) project in Greater Kailash, New Delhi. **Inside Info** talks about how glass can magically transform bathrooms. In **AIS Fresh**, read about the latest additions to the architectural glass product range, and the inauguration of a first-of-its-kind AIS store in New Delhi.

I hope you like reading this issue of Clariti. I look forward to hearing your thoughts and opinions.

Happy reading, once again!

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COO - Architectural Institutional Business

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Cover Story: Smart Glazing – The future of glass

As one of the most versatile and exquisite building materials, glass offers excellent opportunities for making extraordinary creations in architecture and interior design. Indeed, glass is contributing greatly in the celebration of our living and work spaces and of our lives.

As enchanting as the nature and effect of glass is, its marriage with state-of-the-art technology is creating results that are as sophisticated as they are aesthetic. One example is 'smart glazing' – glass whose light transmission properties are altered by technology, so that it can interchange instantly between transparency, translucency, and opaqueness. Smart glass is used for windows, skylights, doors, and partitions, and is available as laminated panels or insulated glass units.

A smart investment

The demand for smart glass has been increasing for two reasons: modern lifestyle requirements of comfort, convenience, privacy, and energy efficiency; and being a differentiated product in the highly competitive glass industry. As such, investment worth hundreds of millions of dollars has been made in smart glass technology over the past few years.

Technologies for a smart future

A number of futuristic technologies, like electrochromic, thermochromic, suspended particle, and liquid particle, go into the making of smart glazing.



Electrochromic (EC) technology

This is the most promising switchable glass technology today. A one-micron electrochromic thin film stack is deposited on a glass substrate. This stack is made up of ceramic metal oxide coatings with three electrochromic layers sandwiched between two transparent electrical conductors. A voltage between the conductors sets up a distributed electrical field. This moves lithium or hydrogen ions reversibly between the ion storage film through electrolyte and into the electrochromic film.

As a result, the glazing switches between the clear state and the transparent blue-gray tinted state. There is no loss of visual clarity, as in photochromatic eye glasses. Power is needed only to change the glass from one state to the other.

The pros...

- 4Less energy consumption: Smart glass controls incoming light and solar heat gain, reducing the need for air-conditioning
- 4Energy efficiency: It requires very low-voltage power (0–10 volts DC) to operate
- 4Reduced costs: Control and modulation of incoming light and solar heat gain leads to lower energy bills and occupants' comfort.
- 4Privacy: When you need it
- 4Convenience: Reduces the need for mechanised and automated blinds
- 4Protects upholstery and furniture: Darkening prevents fading due to sunlight
- 4Better security: When darkened

...and cons

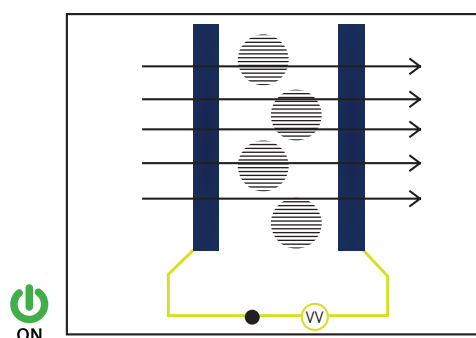
- 4Shorter lifespan: Than traditional glazing
- 4Slow transition between clear and opaque states

Suspended Particle Device technology

This technology enables manual and precise control of light and heat, compared to electrochromism. Rod-like nano particles are suspended in a liquid placed between two layers of glass or plastic. In the unpowered state, the randomly organised particles block light and the view. When voltage is applied, the particles align to allow light and to enable transparency. Varying the voltage of the film regulates the amount of light transmission and, hence, the tint of the glazing of the glass window or partition.

The pros...

- 4Less energy consumption: Precise heat and light control reduces need for air-conditioning and heating
- 4Reduced costs: Of installing and running ACs and heaters
- 4Comfort & convenience: With 99% UV blockage and state switching in 1–3 seconds
- 4Eliminates the need for expensive window dressings



Aligned liquid crystals allow light to pass

Polymer Dispersed Liquid Crystal (PDLC) Device technology

In LCD technology, electricity changes the shape of liquid crystals, allowing light to pass through them and forming colours, images, figures, and numbers on flat panel displays. Commonly used products, like portable computers, cellular phones, calculators, digital clocks and watches, are examples.

PDLC technology is a combined application of polymers and liquid crystals. In response to electricity, liquid crystal droplets align in parallel, permitting light to pass and resulting in transparency. Without electrical charge, the droplets are randomly oriented and light is heavily scattered, resulting in opaqueness. Continuous power (between 24 and 100 volts AC) is required for the clear state.

The pros...

- 4Beats all other technologies in terms of switching speed and opacity

...and cons

- 4Only two states (clear or opaque) can be achieved

Other technologies

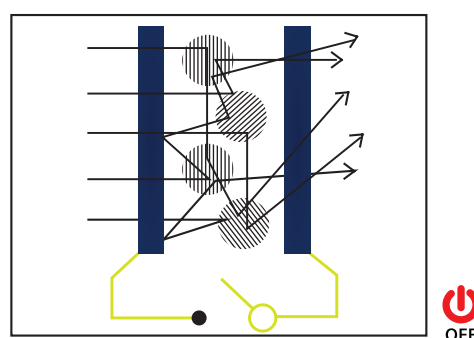
Micro-blinds are very tiny, rolled, thin metal blinds on glass. With no applied voltage, the micro-blinds are rolled up, letting light pass. With applied voltage, rolled micro-blinds stretch out and block light. Pros include switching speed in milliseconds, UV resistance, customisation, and cost-effectiveness. The technology is still under development.

Nano crystals embedded in glass provide selective control over visible and heat-producing, near-infrared (NIR) light. A small jolt of electricity switches the material between NIR-transmitting and NIR-blocking states. The window can also be switched to a dark mode, blocking both light and heat, or to a fully transparent mode.

AIS Swytchglas: Switching on a new trend

Manufactured using Suspended Particle technology, AIS Swytchglas is a revolutionary smart glass which gives the user flexibility between transparency and opaqueness, while enabling control of both heat and light. (Refer to Fig. 1 below). Ideal for a wide variety of applications at home or in the office, it presents the perfect balance between style and necessity. A smart solution from AIS for a smart you.

Smart glazing solutions, with the advantages they offer, are enabling the creation of smart buildings that were unimaginable until a few years ago. And they are inspiring smart living – in a brave new world that is the cause and effect of futuristic technologies in every sphere of human life.



Randomly distributed liquid crystals block light

Fig. 1 - Working of AIS Swytchglas

Case Study: Optimal Building Design and Glazing

This Case Study focuses on the relation of a building's design with its achievement of energy efficiency through glazing.

Normally, glazing solutions for energy efficiency make use of glass with a lower Solar Factor and lower U-Value. However, the scenario was completely different for a learning institute in Mumbai. It successfully achieved energy efficiency using glass with an optimum Solar Factor and U-Value and higher VLT because of its optimal building design. As glazing solutions are expensive, this meant big cost-savings and quicker recovery of investment.

Optimal building design (refer to Fig. 1) greatly reduced the building's direct and indirect heat gain in the following ways:

- ▶ Classrooms located on the north side received diffused light and no direct heat.
- ▶ South-facing classrooms were provided with a shading device to prevent direct heat and glare.
- ▶ Buffer zones, created by placing the service areas along the east façade and corridors along the west façade, prevented heat ingress in the offices.
- ▶ Walls had good insulation properties to prevent long-wave radiations from entering into the building.
- ▶ North light provided natural light to a portion of the building.

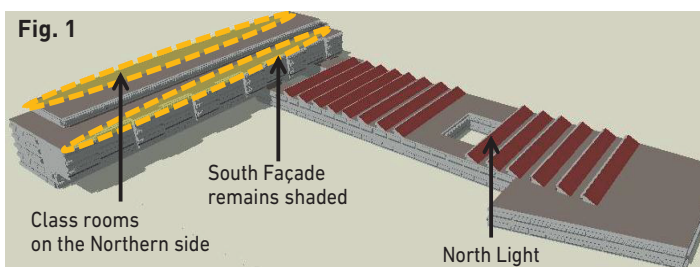


Table 1

Product	VLT %	SF %	U-Value w/m ² k
Base Case – Clear DGU	78	70	2.8
Clear Brook (Solar Control Low-E Glass)	35	26	1.7
Clear Radiance (Solar Control Low-E Glass)	49	33	1.7
Clearlite (Solar Control Low-E Glass)	58	38	1.7
Grey Brook (Solar Control Low-E Glass)	21	19	1.7
Greyvision (Solar Control Low-E Glass)	23	20	1.7
Spring DGU (Solar Control Glass)	60	52	2.8
Spring SGU (Solar Control Glass)	65	64	5.4

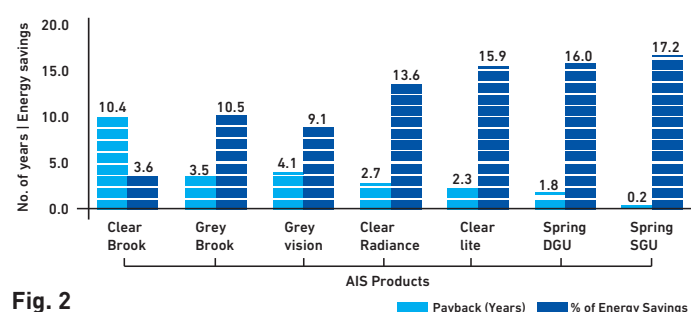


Fig. 2

The result: Building design matters in achieving energy efficiency

A detailed building energy analysis was conducted wherein various AIS products were considered, (Performance parameters given in Table 1.) As shown in Fig 2, Spring SGU (Solar Control product from the Ecosense range) which has Solar Factor (SF) = 64%, Visual Light Transmission (VLT) = 65%, and U-Value = 5.4 w/m²k performs best out of all the glasses with 17% energy savings and 2 months' payback period, when compared to base case Clear DGU (double glaze unit).

The building design, orientation and shading strategy made it possible to achieve the desired energy efficiency with relaxed glass values.

Eye Catcher!

A project by AIS VUE: uPVC Doors and Windows in Greater Kailash, New Delhi



Watch the customer speak about his AIS VUE experience on our YouTube channel.

Inside Info:

Clearly Stylish Bathrooms

Homeowners these days are looking for unique, modern and sophisticated bathroom décor. And they are turning to glass due to the myriad design options it offers, in addition to its unmatched high-end appearance.

Bathroom shower designs have evolved from the use of traditional shower doors and curtains to chic glass screens and shower enclosures that offer utility as well as contemporary aesthetic appeal.

Glass screens and **shower enclosures** can be made with **AIS Stronglas** (high-quality tempered glass) or **AIS Securityglas** (laminated glass with PVB interlayer) that are extremely safe and durable. They enable the separation of wet and dry areas, and also give the impression of more space, making your bathroom look elegant, large, and bright.

Glass shelves are ideal for bathrooms as they are light and unobtrusive, making the area look less cluttered.

A wide range of **mirrors** is available, in terms of colours, patterns, and effects, to render a stylish and designer look to the bathroom, besides enhancing the feeling of spaciousness.

Glass tiles can be used on shower walls, tub surrounds, and as a backsplash. **AIS Décor**, which is lacquered / back-painted glass, is ideal for such applications. Its unique opaque, coloured appearance adds life to the bathroom. It is also moisture-resistant.

Glass washbasins are yet another unique feature in modern-day bath areas. Clear, tinted, frosted, or patterned glass can be used to create elegant washbasins.



AIS Fresh

AIS has expanded its portfolio, again! Here are the new offerings:

In the lacquered glass range - AIS Décor

Chrome Yellow
Stone Grey
Turquoise Green
Hazel Brown



In the solar control heat-reflective glass range - AIS Opal
Olive Green



In its endeavour to connect to its customers, AIS has brought two experts, Glasxperts and Windshield Experts, together under one roof at a retail showroom in South Extension, New Delhi. Glasxperts and Windshield Experts are service offerings from AIS for architectural and automotive glass consumers. The inauguration was attended by high-profile anchor, dancer, and actress Ms. Shivani Wazir Pasrich, Ar. Sunil Taneja, entrepreneur, and Mr. Arjun Khanna, along with top management personnel from AIS.



Have a comment or a suggestion? Let us know! Write to us at seemore@aisglass.com

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