



## DYNAMIC GLAZING SOLUTIONS: VISUAL COMFORT, THERMAL COMFORT AND ENERGY SAVINGS

In buildings, it is always important to ensure the comfort and wellbeing of occupants. Natural light and uninterrupted views of the outdoors can improve productivity, focus and creativity of occupants.

Today, glazing for buildings is still dominated by the use of mechanical sun protection devices such as blinds and shades, which actually block the views of the outside and prevent natural light entering the building.

**By using a Dynamic Glazing solution – sometimes referred to as switchable glass, dynamic shading or intelligent glass – the glazing tints it-self dynamically, adapting to varying light conditions to offer instantaneous visual and thermal comfort to the building's occupants.**

### Barriers to adoption

In the last couple of years, a number of dynamic glazing solutions have become available on the market. However, adoption has been limited due to several factors. First, most available glazing solutions on the market have a bluish or yellowish colour reflection and transmission, which is not aesthetically pleasing for architects, façade consultants and occupants. Furthermore, almost all available product solutions have a slow transition of around 15 minutes and require relatively high energy to operate.



## Leading product solutions

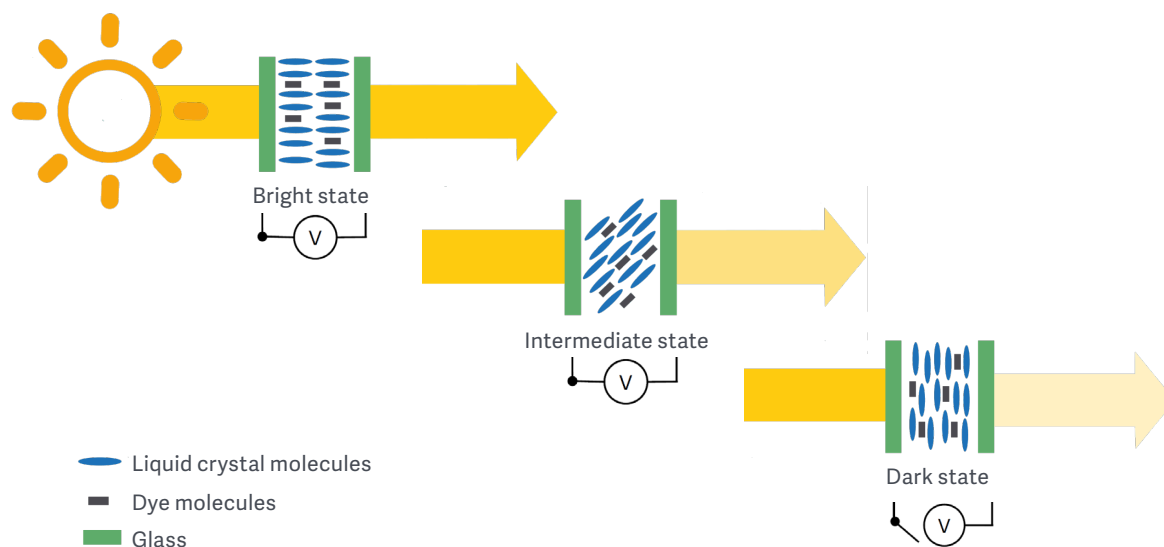
eyrise<sup>®</sup> s350 Instant Solar Shading Windows perfectly complement Guardian's high performance glass solutions particularly the Guardian SunGuard<sup>®</sup> range of advanced solar control glass products.

## State-of-the-art dynamic glass

Dynamic Liquid Crystal Windows

Compared to other dynamic glazing solutions available in the market, according to Merck, eyrise<sup>®</sup> s350 Instant Solar Shading Windows have the fastest switching speed, most neutral colour rendering, and is based on Merck's licrivision<sup>®</sup> liquid crystal technology, omnipresent in everyday LCD screens.

## Liquid crystal glazing



## How do eyrise<sup>®</sup> Instant Solar Shading Windows work?

At the heart of eyrise<sup>®</sup> s350 Instant Solar Shading Windows is Merck licrivision<sup>®</sup> technology, a transparent liquid crystal mixture added with specific dye molecules tailored to the colour needs of the application. Prompted by low voltage, the mixture molecules of this liquid crystal cell change orientation and therefore regulate the amount of light and heat passing through.

With eyrise<sup>®</sup> Instant Solar Shading Windows and Guardian SunGuard<sup>®</sup> solar control glass, a complete range of solutions with unparalleled aesthetics for structural facades is now available.



# KEY BENEFITS OF DYNAMIC GLAZING SOLUTION

The primary functions of eyrise® Instant Solar Shading Windows are to provide immediate shading comfort, reduced sun glare, improved thermal comfort, while allowing plenty of natural light and preserving views of the outside.

## **Improves users' visual comfort / higher occupant productivity**

- Reduces diffused and reflected sun glare.
- Continuous view of the outside environment.
- Eliminates or greatly reduces the need for mechanical blinds or shades.
- Improves daylight autonomy (reduces the use of artificial lighting).

## **Improves the value of the building/green building certification adds value**

- For building owners, green or wellness building certifications such as BREEAM, LEED, WELL can help to achieve higher rents and greater occupancy levels than lower ranked buildings. Tenants are usually willing to pay a premium for this.

## **Energy efficiency – reduced overheads and running costs**

- Compared to standard double-glazed windows, it provides possibility for energy savings through optimised G-value, particularly in terms of reduced cooling (air conditioning) running costs for the building.








## **Improves users' thermal comfort**

- Optimised solar control performance with fast adaption to changing light conditions and the G-value.



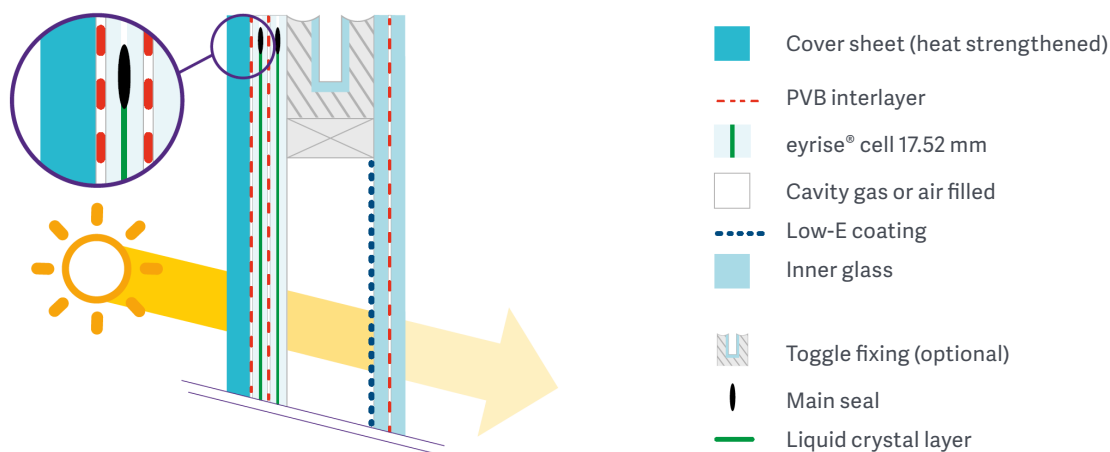
## COMPARISON WITH COMPETING PRODUCTS

Although dynamic shading and switchable glass have been available for more than 10 years, most of these work on electrochromic technology, a chemical-based process that suffers from some major limitations:

TECHNOLOGY	LIQUID CRYSTALS (EYRISE <sup>®</sup> INSTANT SOLAR SHADING WINDOWS)	ELECTROCHROMIC*
 <b>Switching time</b>	Fast reaction (switching in < 1 sec).	Slow switching speed (5-30 mins) depends on temperature & window size.
 <b>Colour</b>	Neutral reflection and light transmission (in its clear and tinted state).	Yellow tint in its clear state. Blue residual colour in tinted state, which creates colour distortions of indoor and outdoor environment.
 <b>Shapes &amp; sizes</b>	Bespoke shapes (multifaceted up to 8 edges).	Bespoke shapes are difficult to make, as intensity-driven technology complicates the tinting process.
 <b>Uniformity</b>	Colour uniformity across windows and inside the same window.	Colour is non-uniform from window to window and inside the same window.
 <b>Reliability</b>	Physical process which is very robust regarding switching cycles over a long period.	Chemical switching process which is possibly sensitive to loss of efficiency and speed.
 <b>Energy</b>	Low energy consumption (1.0 W/sqm).	Best performance electrochromic products have high energy consumption (> 10W/sqm).
 <b>Service</b>	Produced in Europe, Technical support team in Europe.	Best performance electrochromic products are not produced in Europe.

\*Generally true but may not fully represent each individual product

# TYPICAL INSULATED GLASS



## eyrise® glass performance

The tables below illustrate the performance of a selection of eyrise® IGUs (Insulated Glass Units) made with different liquid crystal mixtures. Values were calculated, according to EN-410 and EN-673, in both bright and dark states, using 2 different configurations.

Configuration: 23.04 mm / 16 mm argon / 6 mm with low E coating (Guardian ClimaGuard® Premium2)

EYRISE® LIQUID CRYSTAL MIXTURE	LIGHT TRANSMITTANCE		SOLAR FACTOR / G-VALUE		GENERAL COLOR RENDERING INDEX	
	Bright (%)	Dark (%)	Bright	Dark	R <sub>a</sub> Bright	R <sub>a</sub> Dark
LC mixture A	60	29	0.41	0.31	96	97
LC mixture B	57	18	0.39	0.23	96	96
LC mixture C	52	11	0.37	0.20	96	95
LC mixture D	48	7	0.35	0.18	96	94
LC mixture E	39	2	0.32	0.15	95	74

Configuration: 23.04 mm / 16 mm argon / 6 mm with solar control coating (Guardian SunGuard® SuperNeutral® SN 75)

EYRISE® LIQUID CRYSTAL MIXTURE	LIGHT TRANSMITTANCE		SOLAR FACTOR / G-VALUE		GENERAL COLOR RENDERING INDEX	
	Bright (%)	Dark (%)	Bright	Dark	R <sub>a</sub> Bright	R <sub>a</sub> Dark
LC mixture A	55	26	0.33	0.21	93	95
LC mixture B	53	17	0.32	0.17	93	94
LC mixture C	49	11	0.30	0.14	92	93
LC mixture D	45	7	0.28	0.12	92	92
LC mixture E	37	2	0.25	0.09	92	76

### Further help

Guardian Glass' experienced team is perfectly placed to help you find the best dynamic glazing solution to fulfill the aesthetic and performance requirements of your unique application, including how to integrate dynamic glazing into a total façade solution. If you would like to learn more about our dynamic glazing solution or if you have specific questions about your project, please contact your local Guardian Glass expert.