Smart Window: The Windows ofthe Futureaa

What Are Switch glass?

Switch glass are electronically tintable glass orglazing switching between clear and dark states, either remotely orautomatically. They use electrochromic technology that allows windows to bedarkened to control sun exposure and heat gain. When an electrical currentis applied, special coatings in the glass will darken to varying degrees,according to the strength of the electrical signal. Cutting off up to 99% of incomingvisible light, switch glass provides superior solar control compared totraditional methods such as curtains, blinds, or tinted glass.

How Do Switch glass Work?

At the core of every Switch Glass is a thin film of electrochromic materialsandwiched between two transparent conductors. The most commonelectrochromic material is tungsten oxide, which changes appearance based on itsoxidation state. In its regular state, tungsten oxide is transparent and colorless,allowing maximum visible light transmission. However, when a small voltage isapplied, electrochromic ions embedded in the material migrate and reshapeits molecular structure, causing it to darken as electron densitiesredistribute. Other electrochromic materials like nickel oxide and viologenpolychromics undergo similar changes to different darkened color spectra.

By controlling the voltage applied, windows can bedimmed to any shade from fully clear to completely dark or some setting inbetween. The processis completely reversible – removing the voltage causesthe material to return to its transparent state. No moving parts are involved. Switching speeds range from just a few seconds to transition between optical states to aminute or two to achieve fully darkened or cleared glass. The tinting effect is consistent across the entire pane.