Can using glass in design really provide energy efficiency?

GLASSWORKS

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Introduction

Choosing the right type of glass has long since been a key element to consider when designing or refurbishing a space. The clarity and aesthetic nature of glass is unmatched in its ability to not only provide natural light, but to also create stunning architectural facades.

However, with up to 40 percent of a home's heating lost, and more than 87 percent of it gained through windows alone; the thermal performance in glass is a crucial element to consider when cutting down on energy costs and consumption[1].

The right type of glass possesses the unique ability to retain heat in the winter[2], all the while ensuring that your home is also kept cool in the warmer months.

But with Australia's widely diverse and varying climate, it can be both difficult and time consuming to select the right type of glass for the application.

Understanding performance glass products

The right type of performance glass can make your home more comfortable, dramatically reduce your power bill and is critical to a building's energy efficiency.

In most cases, regular windows - notorious for unwanted heat loss and gain - are not adequate enough for current home designs, let alone to meet today's stringent building regulations[3].

By specifying the correct type of performance glass for your project; studies show that you can increase a building's energy-efficiency by up to 2.5 stars simply by switching out ordinary aluminium single glazed glass, for the best performance glass available for the climate[4].

A common misconception prevalent among consumers is that performance glass products are an expensive way to increase energy efficiency in buildings. However it is important to consider that windows - even ordinary ones - make for a relatively high-value component of a building, meaning the investment could be the difference between owning a high value property or one with a lower valuation.

Heat, gain and loss

Windows, doors and skylights can gain and lose heat through[5]:

- The radiation of heat into a building and out of a building from room-temperature objects, such as people, furniture, and walls
- Direct conduction through glass or glazing
- Air leakage

These properties can be measured and rated by considering two distinct heat transfer mechanisms: conduction and solar heat gain.

The conduction - or U-value - measures how much heat is transferred through the glass. The lower the U-Value, the better the insulation properties of the glass, the more adept at keeping the heat or cold out.

The solar heat gain - or SHGC - looks at how much solar radiation passes through the glass. The higher the SHGC rating, the more radiation passes through, the more you can benefit from free thermal heating.

All in all, paying special consideration to the U-value and SHGC rating of performance glass products ensures that a building's occupants remain thermally comfortable, without having to resort to artificial heating or cooling methods.

The relationship between low emissivity glass and energy efficiency

One of the key developments in glass efficiency has been the technological advances in low-e (low-emissivity) glass products over the past two decades.

Coated in microscopic layers of metallic oxides, low-e glass is designed to let in as much natural light into a building as possible, all the while retaining and controlling radiant heat (infrared light) as it enters and leaves a room[6].

The use of low-e glass products contributes significantly to a building's energy efficiency, yielding excellent results for both solar control and thermal insulation.

Health benefits associated to reducing auxiliary temperature control

While energy bill savings are an obvious benefit associated to reducing artificial heating or cooling, the health and productivity of building occupants can also be greatly affected.

With workers typically spending upwards of eight hours a day in air-conditioned buildings; minor yet irritating health concerns such as: respiratory tract problems, allergic reactions and viral and bacterial infections can occur[7].

Utilizing the right type of performance glass can greatly reduce the need for auxiliary temperature control, reducing the risk of spreading these diseases, as well as increasing overall productivity and happiness in the workplace.

The Glassworks Solution

Glassworks is able to offer a range of market-leading low-e glass products that are perfect for a range of different applications:

- LoE 366® is neutral in colour with high visible light transmission (VLT), it offers thermal-stopping power, solar control and high visibility – making it the perfect all-rounder
- LoE 340® is blue/grey in colour and features a SHGC figure of 0.18 - the lowest of any readily stocked glass on the Australian the market.
- LoE-I89® is available in clear or grey models and is suitable for warm climates, particularly those experiencing extreme seasonal temperature fluctuations - meeting the most stringent of energy-efficient guidelines

Working harmoniously alongside low-e glass is another Australian-first innovation - SolarAdapt™, a solar responsive thermochromic (SRT) adaptive glazing film.

SolarAdapt (SRT) works by utilising the sun's energy to cause the tinting of the window, making it the perfect fit for sustainable building design. It combines perfectly with the best low-e products and can achieve and SHGC of just of just 0.13, compared with 0.70 of regular IGU's.

In addition, all performance glass products come standard with Neat® technology; a coating system that harnesses the sun's rays to loosen dirt for the rain to wash away, and is the only monolithic product on the world market that offers both energy insulation and easy-clean innovation.

Combining these recent innovations in glass design technology; Glasswork's range of low-e performance glass products are paving the way for a new generation of energy-efficient buildings that are not only cost-effective to run, but also comfortable no matter the climate.

**Calculations based on Windows 7.2 NFRC 100-2010 conditions*

	LoE-366®		LoE-344®		LoE-189®			
	6mm LoE366 ®12mm Arg 6mm Clear Float	6mm LoE366® 12mm Arg 6mm i89	6mm LoE340® 12mm Arg 6mm Clear Float	6mm LoE340 12mm Arg 6mm i89 Clear	6mm i89 Clear Mono	6mm i89 Clear 12mm Arg 6mm Clear Float	6mm i89 Grey mono	6mm i89 Grey 12mm Arg 6mm Clear Float
VLT	63%	61%	38%	37%	87%	80%	30%	26%
Ext Red	11%	10%	13%	13%	8%	15%	12%	12%
SHGC	0.27	0.27	0.18	0.17	0.72	0.65	0.33	0.25
U-Value	1.35	1.10	1.36	1.11	3.62	1.64	3.70	1.66

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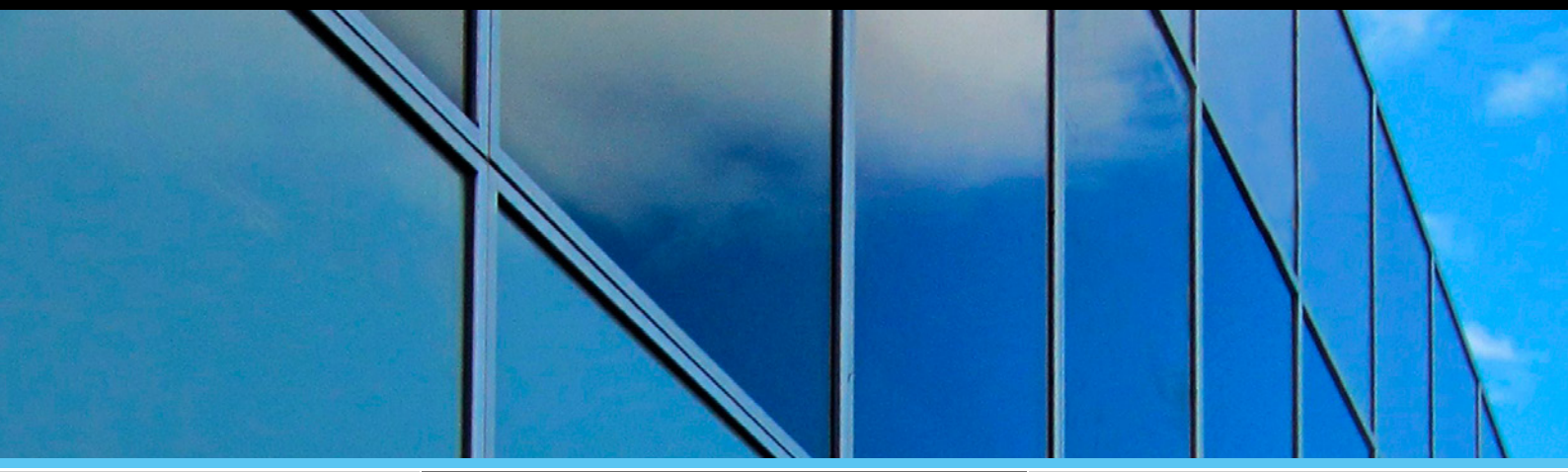

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