

Thermawood[®]
RETROFIT & NEW TIMBER DOUBLE GLAZING SYSTEMS



THE ULTIMATE WINDOW INSULATION GUIDE

HOW TO KEEP THE HEAT IN OR OUT

thermawood.co.nz

HOW TO KEEP

THE HEAT IN OR OUT

Whether you're contending with chilly draughts or the scorching sun, your windows serve as the primary gateway for heat exchange, rendering them your home's foremost thermal challenge.

Rather than allowing heat to escape during cold seasons or turning your living space into an oven during hot weather, installing the appropriate double glazing system can effectively keep your interiors cosy when needed and prevent excessive warmth from infiltrating. Today, both builders and property owners are embracing double glazed windows due to a growing awareness of the remarkable energy efficiency benefits and the enhanced comfort they offer in residential and working spaces.

The traditional practice of using single-pane windows no longer aligns with modern sensibilities. It not only wastes energy but also burdens you with unnecessary heating and cooling costs, while contributing to your carbon footprint. Additionally, single-pane windows expose you to issues like persistent noise pollution and hinder the creation of a comfortable indoor environment.

Modern double glazing technology has revolutionised the functionality of windows. With custom double glazed windows tailored to your property's unique requirements, you can enjoy:

1. A consistently comfortable indoor environment.
2. Drastically reduced energy bills.
3. The satisfaction of optimising your windows for 21st-century expectations, instead of losing money and comfort.

So, how does double glazing effectively manage both extreme temperatures, and what options do property owners have for window insulation? Are there any DIY alternatives to enhance home insulation?

When it comes to thermal insulation, numerous methods are available. However, not all are created equal. The most efficient and consumer-oriented approach to insulating your windows may not necessarily be the most expensive, but it's the one that makes the most practical sense.

Discover the facts about window insulation, including the effectiveness of double glazing, the science behind low-emissivity (Low-E) glass, and a comprehensive exploration of your choices to maximise the value of your windows.

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01

DIY WINDOW INSULATION

CONSIDERATIONS

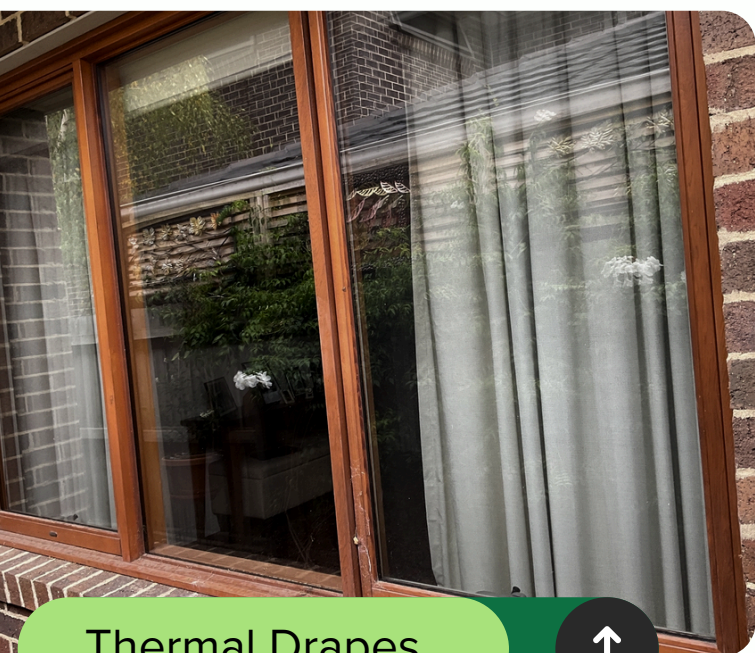
There are various approaches to insulating your windows, each offering different levels of thermal protection against both heat and cold

WINDOW DRESSINGS FOR INSULATION

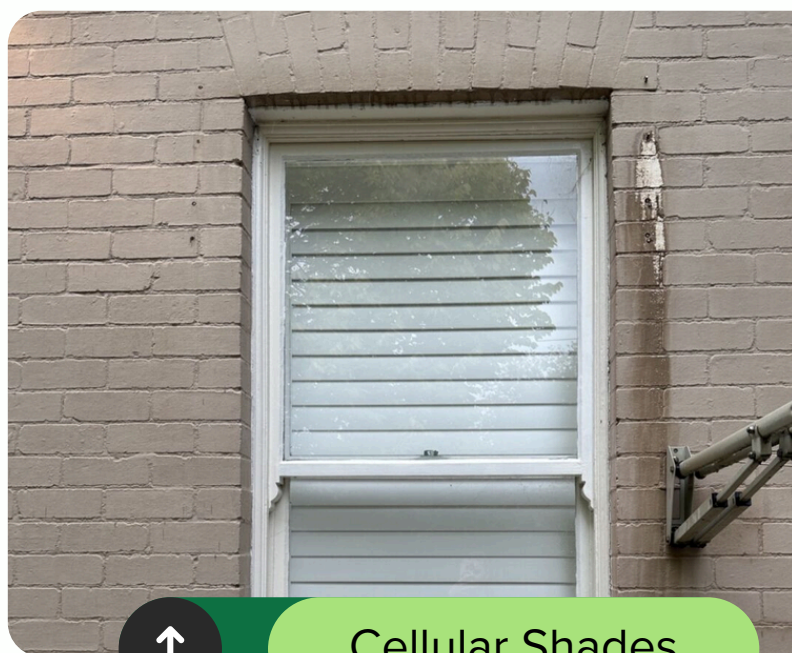
One of the simplest DIY methods involves using specialized window dressings that offer superior insulation compared to standard curtains and blinds.

Types of Window Dressings

- **Thermal Drapes:** These curtains are designed to provide extra insulation by trapping air around your windows.
- **Cellular Shades:** Also known as honeycomb shades, these feature pockets that trap air. Double or triple cell shades offer enhanced insulation.



Thermal Drapes



Cellular Shades

Combining Window Dressings

Combining different types of window dressings can improve insulation results, such as pairing thermal curtains with cellular shades.

Limitations of Window Dressings

However, window dressings alone cannot address draughts, leaving your home susceptible to chilly air infiltration and heat loss. In warmer climates, while window dressings can provide shading benefits, the impact may not be significant. There's also the risk of trapping excess heat, potentially exacerbating overheating issues if not used carefully. Moreover, keeping curtains, blinds, or shades closed for even minimal insulation means sacrificing the beautiful natural light that windows offer.



SEALING WINDOWS

Another DIY method involves sealing your windows using caulking around the casings and weather stripping around the sash. This effectively blocks air leaks, reducing heat loss.

INSULATING WINDOW FILM

A third option is applying an insulating window film directly to the interior of your windows, creating an air gap that minimizes heat transfer.

Low-Emissivity (Low-E) Film

Low-emissivity (Low-E) film can also be used to transform your existing window into a Low-E product, reflecting heat back into your space.



CONCLUSION

While DIY methods can provide some level of insulation, it's essential to keep in mind that the cumulative impact of these methods may not yield a significant difference. In many cases, investing your time and money in a professional solution can comprehensively address your window's thermal vulnerabilities once and for all.



02

WHY DOUBLE GLAZING MAKES

A MAJOR DIFFERENCE

When it comes to thermal insulation benefits, the impact of double glazed windows is both palpable and visible on your energy bills. Several factors contribute to the remarkable efficacy of double glazing:

- 1. Customizable Air Gap** : Double glazing establishes a tailor-made air gap that significantly reduces the transfer of heat.
- 2. Enhanced Insulation** : The inclusion of two glass panes acts as a formidable barrier against cold air, scorching temperatures, and intrusive noise. Additionally, it effectively retains warm air within your living space during the winter months.
- 3. Professional Installation**: Double glazing involves the installation of an Insulated Glass Unit (IGU) in place of a single pane of glass. This approach allows you to upgrade to a superior glass, such as thermal glass, perfectly suited for maintaining your desired interior temperature.

STRUCTURE OF AN IGU

An IGU consists of two glass panes separated by an air gap. Importantly, both the glass panes and the air gap can be customised to cater to your specific insulation requirements for every window in your home.


CUSTOMIZATION FOR OPTIMAL INSULATION

This level of customisation empowers you to choose thermal glass for those sun-drenched north and west-facing windows prone to overheating, while opting for a tailored IGU for your colder south-facing windows, often the chilliest areas during winter. This flexibility allows you to address specific property-related concerns effectively.

DYNAMIC THERMAL INSULATION SYSTEM

The true power of double glazing lies in the creation of a dynamic thermal insulation system, rather than simply adding more material or creating a makeshift air gap.

It's worth noting that your options extend beyond double glazing. The manner in which an IGU is installed can significantly impact its performance and cost. Double glazed windows can either be newly installed or retrofitted. With either solution, you can enjoy the same personalised IGU, but the results can vary considerably based on the installation method you choose.



03

ADVANTAGES OF THERMAWOOD RETROFIT

DOUBLE GLAZING

When it comes to upgrading your windows with double glazing, there are two distinct approaches to consider:

1. NEW DOUBLE GLAZED WINDOWS

In this method, your existing window, including the glass pane and frame, is completely removed. A new frame and the Insulated Glass Unit (IGU) are installed to provide the benefits of double glazing.

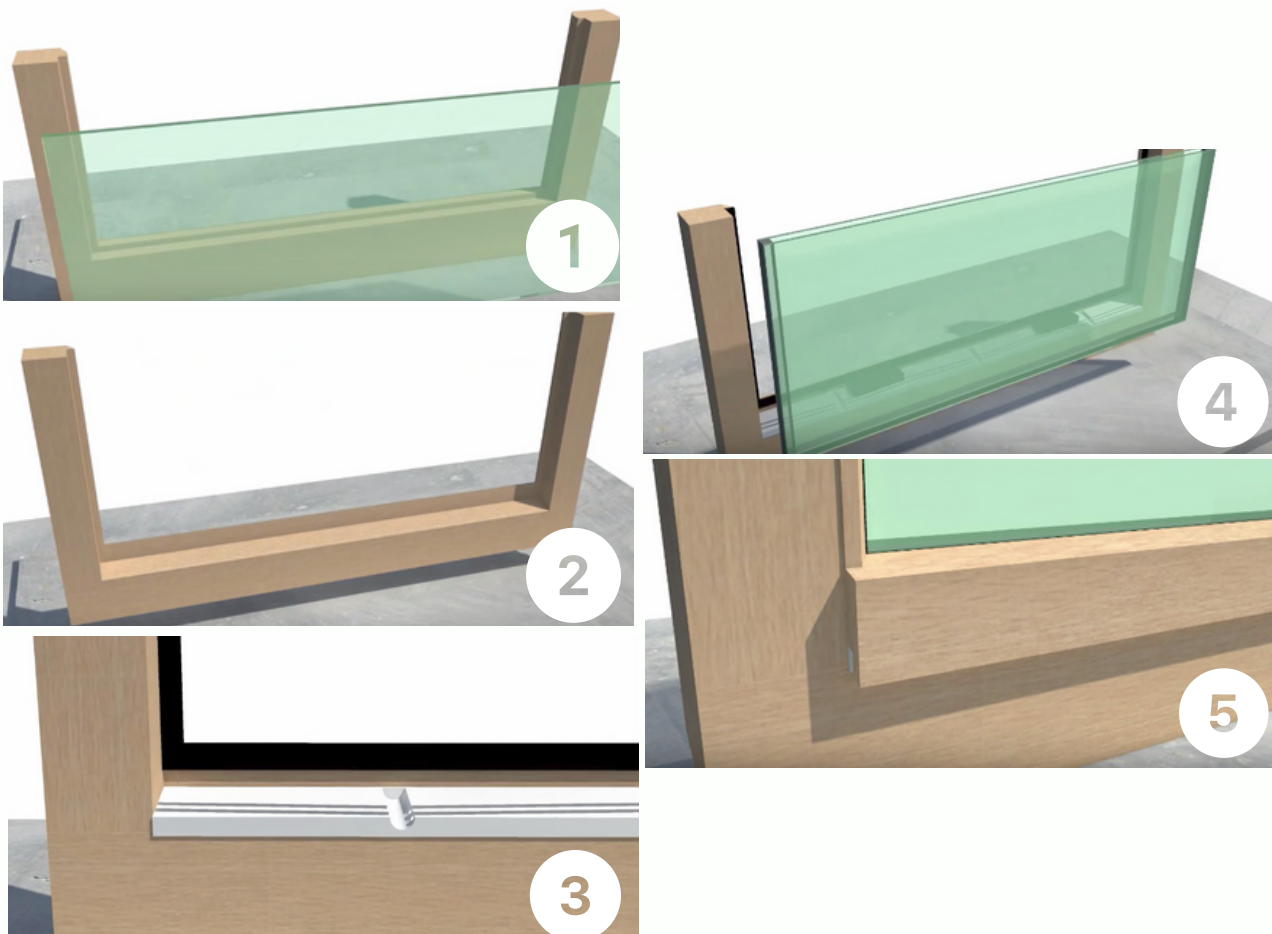
2. THERMAWOOD'S PATENTED RETROFIT DOUBLE GLAZING

Innovative Process

This innovative process focuses on **converting** your existing windows rather than a full replacement.

It's specifically designed for windows with timber frames.

With this approach, your current wooden window remains in place, and the single pane is replaced with an IGU. Notably, this method is more streamlined and preserves the original character of your windows.





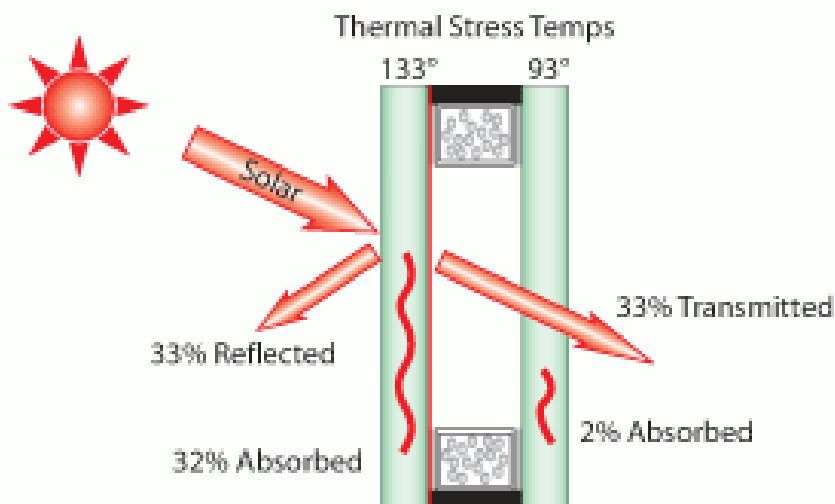
Unique, Patented System

Thermawood franchisees employ a unique, patented dry retrofit double glazing system. This system is engineered to minimise moisture in the glazing rebate, thereby reducing the risk of unit failure. This is vital for the longevity of your insulated glass units and ensures Thermawoods windows will stand the test of time.

Additional Enhancements

Whether you opt for new double-glazed windows or the retrofit approach, you can further enhance their performance by incorporating specialized thermal glass known as Low-E glass. Low-E glass is highly effective for retaining interior heat when needed and preventing excessive heat from entering during hot weather. It's a versatile solution that helps maintain comfort year-round.

HIGH PERFORMANCE LOW-E INSULATED GLASS UNIT



BENEFITS OF RETROFIT DOUBLE GLAZING

Preservation of Original Windows

The retrofit method allows you to keep your original windows, maintaining the aesthetic and historic value of your property.

Very important if your home has a Heritage Overlay.

Cost-Effective Solution

Retrofitting is generally more cost-effective than a full window replacement, as it utilizes the existing window frame.

Improved Thermal Performance

By upgrading to an IGU with Low-E glass, retrofit double glazing significantly enhances thermal insulation, reducing energy bills and increasing indoor comfort.

Moisture Reduction

Thermawood's patented system minimizes moisture, protecting your windows from moisture-related damage and prolonging their lifespan.



BEFORE

AFTER





04

UNVEILING THE SCIENCE

BEHIND LOW-E GLASS

Low-E, or low emissivity, glass revolves around the concept of minimising a material's surface emissivity, which dictates how effectively it radiates energy. When it comes to superior insulation, a lower emissivity is the key.

UNDERSTANDING EMISSIVITY

All materials naturally radiate heat energy to some extent. The more reflective the material's surface, the better it can deflect heat and minimise heat radiation. Radiant heat transfer plays a pivotal role in how windows manage temperature. In a double-glazing unit, Low-E glass bounces thermal energy back to its source rather than allowing it to pass through the glass.



THE COMPOSITION OF LOW-E GLASS

Low-E glass is coated with an ultra-thin layer, often composed of silver and other low-E materials. This layer is thinner than a human hair and, like a mirror, reflects visible light and infrared light.

In terms of insulation, it reflects short-wave infrared light. This property enables Low-E glass to keep interiors warm in winter and cool in summer, reflecting heat back inside during cold weather and preventing excessive heat entry during hot seasons.

In essence, it consistently redirects short-wave heat back to its source.

As a result, Low-E glass significantly enhances a building's energy efficiency, whether in cold or warm climates.

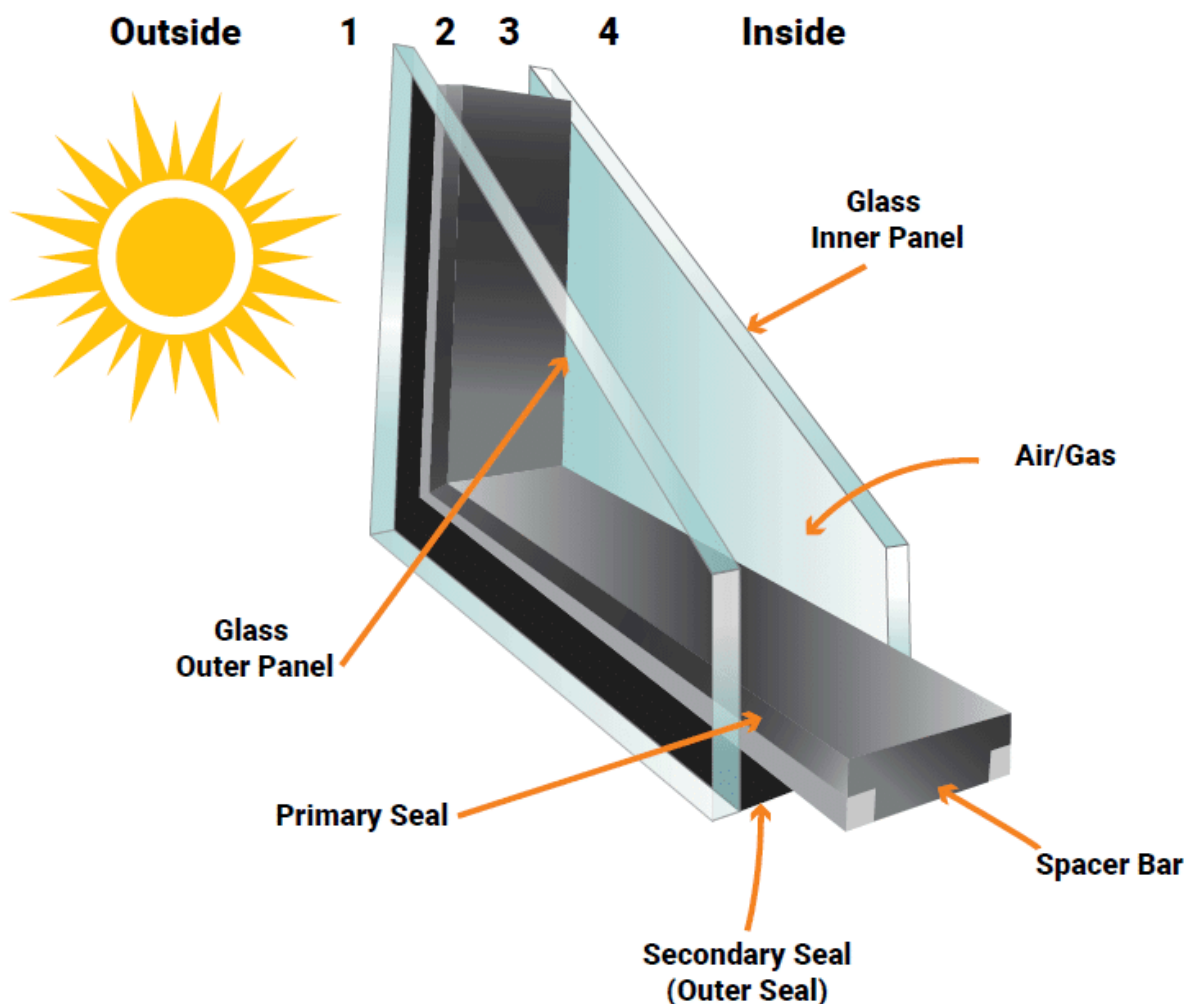


05

**LOCATING THE LOW-
E COATING IN AN**

INSULATED GLASS UNIT (IGU)

When using double glazing to enhance window insulation, you only need a single piece of thermal glass in the IGU. The other glass pane can be standard or specialised, like acoustic glass. The Low-E coating is invariably positioned on one of the two inner surfaces of an IGU: the inner-facing surface of the exterior pane or the outer-facing surface of the inner pane.



THE STRUCTURE OF AN IGU

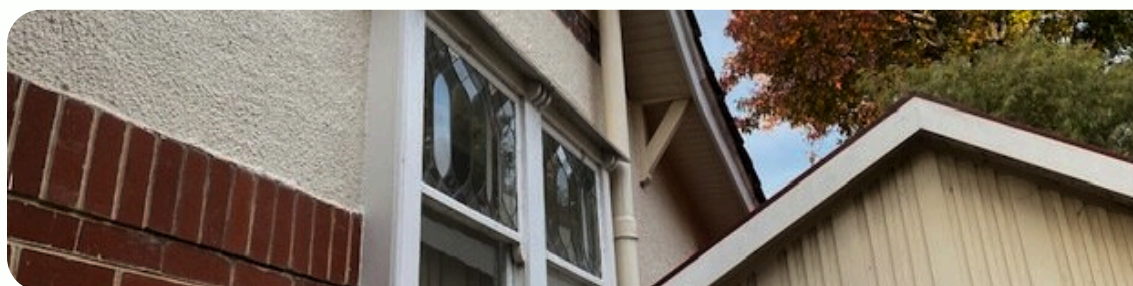
Components of an IGU

An Insulated Glass Unit (IGU) typically consists of two glass panes separated by a spacer, creating an air or gas-filled gap that enhances thermal performance. In double glazing, the addition of Low-E glass significantly improves insulation by reflecting thermal energy.

Positioning of the Low-E Coating

The Low-E coating is crucial for maximizing the thermal efficiency of an IGU. It is strategically applied to one of the two inner surfaces within the unit:

- Inner-Facing Surface of the Exterior Pane: This placement helps reflect heat back into the room during winter and reflects external heat away during summer.
- Outer-Facing Surface of the Inner Pane: This position also contributes to thermal reflection, enhancing the overall insulation of the unit.



BENEFITS OF PROPER LOW-E COATING PLACEMENT

Thermal Efficiency

By positioning the Low-E coating on the inner surfaces, the IGU maximizes its ability to reflect thermal energy, maintaining a consistent indoor temperature and reducing the need for artificial heating and cooling.

Flexibility in Glass Selection

Since only one pane needs to be thermal glass, the other pane can be chosen based on additional needs, such as acoustic performance. This flexibility allows for customized solutions tailored to specific requirements.

CONCLUSION

The strategic placement of the Low-E coating within an IGU plays a vital role in enhancing the thermal insulation of double-glazed windows. By reflecting heat energy effectively, Low-E coatings contribute to improved energy efficiency, reduced energy costs, and increased indoor comfort. Understanding the optimal positioning of the Low-E coating allows homeowners to make informed decisions when upgrading their windows with double glazing.



06

THE IMPACT OF LOW-E GLASS

ON VISIBLE LIGHT

One common concern with Low-E glass is its impact on visibility. Some may assume that its ability to reflect the sun's energy waves would compromise clarity. This isn't the case. Low-E technology is engineered to block infrared and UV rays while allowing visible light to pass through.

This means there is no discernible difference in visible light transmission when using Low-E Soft Coat glass.



UNDERSTANDING LOW-E GLASS AND LIGHT TRANSMISSION

Blocking Infrared and UV Rays

Low-E glass is designed to reflect infrared (IR) and ultraviolet (UV) rays, which are responsible for heat gain and interior furnishings' fading. By blocking these wavelengths, Low-E glass helps maintain a comfortable indoor temperature and protects your home's interior without affecting the visible light spectrum.

Maintaining Clarity and Natural Light

Despite its reflective properties, low-E glass does not hinder visible light transmission. The coating used on low-E glass is ultra-thin and transparent, ensuring that it does not alter the appearance of your windows or the clarity of the view outside.

Benefits of Uncompromised Visible Light

1. **Natural Lighting:** Low-E glass allows ample natural light to enter your home, creating a bright and inviting environment.
2. **Energy Efficiency:** By blocking heat-inducing infrared rays, low-E glass reduces the need for artificial cooling, thereby lowering energy consumption and costs.
3. **UV Protection:** The glass blocks harmful UV rays, preventing fading and damage to furniture, flooring, and other interior elements.



07

**DOES THE LOW-E
COATING AFFECT**

COLOUR OF THE GLASS?



Modern soft-coated Low-E glass maintains the same crystal clarity as standard glass. However, earlier Low-E technology, known as hard-coated Low-E, had a minor aesthetic downside. Sunlight exposure to this type of Low-E glass created a slightly discoloured appearance. Due to advancements in Low-E technology, hard-coated Low-E glass is now rarely used.

Tinted glass, often considered for thermal insulation, is not ideal for double-glazed windows, as it can lead to temperature inconsistencies, potentially causing glass stress and breakage.



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DISTINGUISHING BETWEEN HARD AND

SOFT COAT LOW-E GLASS

Hard coat low-E glass is created through the pyrolytic process. Reflective silver layers are applied to the glass ribbon while it's still hot, fusing the low-E coating with the glass to create a hard coat. It's less commonly used today due to its dusty look in the sunlight and its reduced effectiveness in blocking infrared energy.

Soft coat low-emissivity glass, on the other hand, is applied to the glass after manufacturing and cutting, offering superior thermal insulation, especially in hot and moderate climates.



A photograph of a window with dark shutters and a decorative ironwork arch above it. The window is set in a wall with horizontal siding. Two black chairs are visible in the foreground, and a small potted plant sits on a wooden stump between them. The image is framed by a white border.

09

UNDERSTANDING THE COST

OF LOW-E GLASS



The cost of double-glazed windows depends on the type of glass selected to achieve the desired performance.

Using a single piece of Low-E glass within an IGU can boost a window's insulating properties by up to 40%.

On average, upgrading to Low-E glass increases the overall retrofit job cost by 8% to 12%.

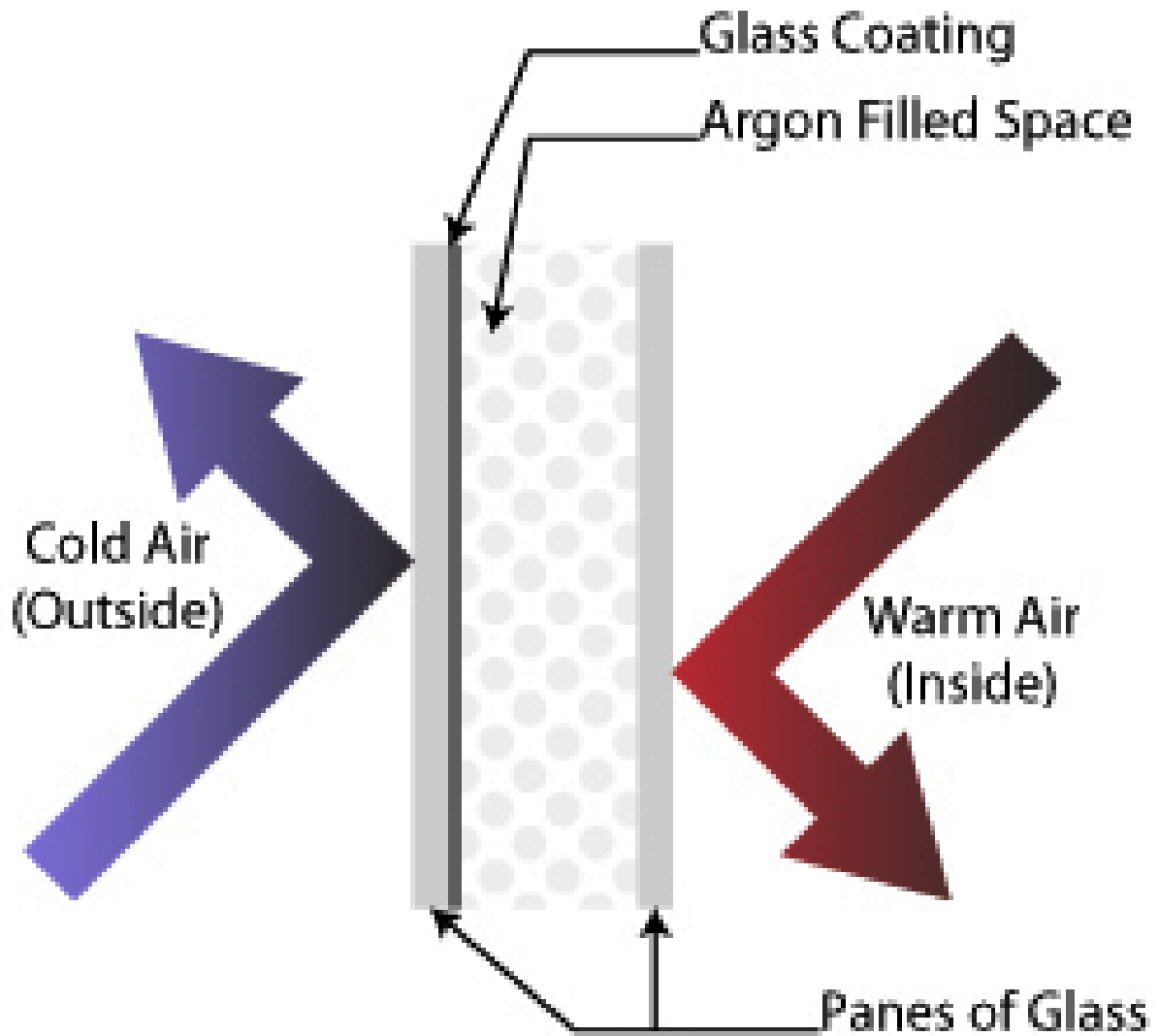
Given the significant insulation and energy efficiency increase, most consumers opt for Low-E glass when double glazing their windows.



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**TAKING IT A STEP
FURTHER**

WITH ARGON GAS



To further enhance an IGU, argon gas can be added to the airspace, offering even better insulation. Argon gas is an inert gas that reduces heat transfer more effectively than dry air. Its thermal conductivity is approximately one-third lower than that of air, resulting in an additional 9% improvement in window insulation. Combining Low-E glass and argon gas can provide nearly a 50% boost in insulating power, leading to substantial energy savings.



11

THE ROLE OF

DRAUGHT SEALS



Even with professional double glazing, Low-E coatings, and argon gas, maintaining an adequately sealed window prevents cold air infiltration and warm air leakage.

Draught seals serve this purpose by blocking cold air and retaining warmth. However, not all double-glazing installers include these seals; when they do, they are often ineffectively attached to the window.

At Thermawood, we machine draught seals directly into the window before retrofitting them, seamlessly integrating them as part of the window. This approach ensures optimal performance and tackles your property's thermal and acoustic concerns.



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INSULATING WINDOWS

FOR HERITAGE BUILDINGS

The Thermawood retrofit double glazing solution extends to heritage-listed buildings. With this method, you retain your existing timber windows, preserving the original charm and character of your heritage windows while upgrading their performance to meet 21st-century standards. This approach not only maintains the aesthetic appeal but also enhances the value of your property. Thermawood has received approval from Heritage for Grade 1 and State-Listed properties, emphasising its suitability for heritage buildings.



Experience the Difference

Beautiful windows combined with optimised thermal insulation at a fraction of the cost of new double-glazed windows have delighted thousands of homeowners across New Zealand & Australia. The result is modern, efficient comfort, substantial energy savings, increased property value, and a practical and achievable solution to sweltering summers and chilly winters. The Thermawood solution delivers an enhanced living experience that is not just cost-effective but also sustainable and enduring.

READY TO EXPERIENCE THE THERMAWOOD DIFFERENCE?

Contact us today for more information on transforming your windows for a better tomorrow.

bit.ly/GetThermawood-NZ

