

NK Windows – Warmer Glass

(Low E and Argon Explained)

Version: 04 Date: April 2020

The energy efficiency and comfort of a home is only as strong as its weakest link, and windows typically contribute to 20-30% of the heat loss from a house. The science of glazing has come a long way over the last decade, including the thermal efficiency and the ability to help protect people and property. The glass you choose will make a significant difference to your comfort and your energy bills.

We offer clients three main glazing options:

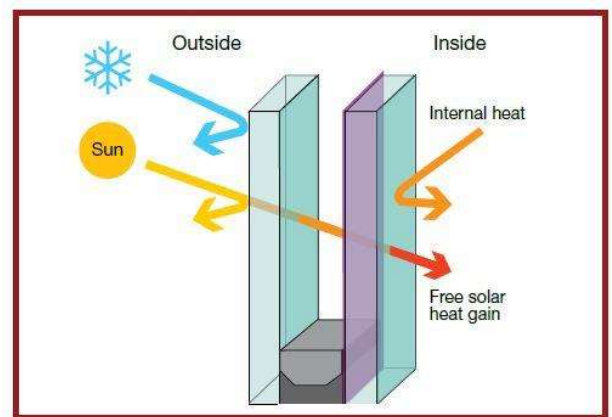
- Standard Double Glazing – two glass panes separated by a 16mm (typical) air chamber.
- Double Glazing with a Low E coating (layer 3) and the chamber filled with Argon gas – again typically a 16mm air gap with a clear coating on one of the internal glass layers and the gap between the glass panes filled with Argon gas. Low E and Argon can be used independently or in combination.
- Triple Glazing with two Low E coatings (layers 2 and 5) and two chambers filled with Argon gas – three panes of glass separated by two 14mm (typical) air gaps. Two of the panes of glass have internal Low E coatings and both air chambers are filled with Argon gas.

Over 90% of our clients choose at least double glazing with the Low E and Argon gas option, as it boosts the thermal performance of the window by over 100%, with 75% of the gain coming from the Low E coatings and 25% coming from the Argon gas.

What is Low E (Low Emissivity)?

The sun radiates ultraviolet (UV) light, visible light and infrared (IR) light. Ultraviolet light causes interior materials such as fabrics, floorings and wall coverings to fade. Visible light is the light humans can see – and also contributes to fading, whilst infrared light is heat energy.

Microscopically thin, transparent silver coatings (Low Emissivity) have been developed to minimize the amount of ultraviolet and infrared light that can pass through glass without compromising the amount of visible light that is transmitted. When the interior heat energy tries to escape to the colder outside during the winter, the Low E coating reflects the heat back to the inside, reducing the radiant heat loss through the glass. The reverse, to a lesser extent, happens during the summer time.



What are the benefits of Argon Gas?

Argon is the gas used between panes in a double- or triple-glazed window. The inert gas is naturally occurring, colourless, odorless and harmless. Argon is denser than the air, providing more thermal efficiency than having just air between the panes. Additionally, the presence of Argon slightly boosts noise insulation performance.

Standard Double Glazing

This is the entry-level option. Glass is a very good thermal conductor, so it makes a lot of sense to provide two panes of glass with a poor conductor between them. In the case of the standard double glazing option, it is normal air. As standard, our windows come with an optimal 16mm gap between the two panes, and we only use plastic warm edge spacers between the glass panes.

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Homeowners should be aware that a gap of less than 12mm is of minimal value from a thermal performance perspective.

Double Glazing with Low E & Argon

This option is installed in over 90% of our clients' homes, including [New Zealand's first 10 Homestar Built rated home](#). This option includes a Low E coating suited to cooler temperate climates on an inside glass face, Argon gas and a warm edge thermal spacer. This combination provides very good winter heat retention and protection against summer overheating and fade damage.

Triple Glazing with Low E & Argon

A small percentage of our clients who are looking to achieve Passive House or near Passive House standard opt for triple glazing. This improves thermal performance by typically another 40%, but comes at a price premium. Remember also that triple glazing significantly increases window weights, and can also increase optical distortion.

The table below shows the thermal performance of common window frame and glass options in NZ.

| Most existing NZ homes current situation | | | |
|--|------------------------------|---------|---------|
| Frame | Glass | R-value | U-value |
| Aluminium | Single Glazed | 0.15 | 6.66 |
| Wooden | Single Glazed | 0.19 | 5.26 |
| Aluminium | Double Glazed | 0.28 | 3.55 |
| Common renovation and new build options | | | |
| Frame | Glass | R-value | U-value |
| Aluminium | Double Glazed | 0.28 | 3.55 |
| Thermally Broken Aluminium | Double Glazed | 0.33 | 3.07 |
| | Double Glazed, Low E & Argon | 0.52 | 1.92 |
| Aluminium | Triple Glazed, Low E & Argon | 0.67 | 1.49 |

| Frame | Glass | R-value | U-value |
|----------------------------------|--|---------|---------|
| NK Windows Ideal 4000 PVC frames | Double Glazed (including warm edge spacer) | 0.39 | 2.56 |
| | Double Glazed, Low E & Argon (including warm edge spacer) | 0.77 | 1.30 |
| | Triple Glazed, Low E & Argon (including warm edge spacers) | 1.04 | 0.96 |

(Note: Based on a standard 1500mm H x 1800mm W window)

Two measures of thermal performance are used in the Building and Construction industry:

- R-value is a measure of thermal resistance, so a higher value is better.
- U-value is a measure of the rate of heat loss, so a lower value is better.

U-values and R-values are the inverse of one another.

Summary of Low E & Argon Benefits

- Less heat loss
- More insulation
- Less condensation
- More comfort
- Less heat gain
- Less glare
- Less fading
- More energy savings

Low E and Argon combined approximately add a 68% thermal efficiency gain over standard clear double-glazing. Additionally, summer solar heat gain drops by 20%, fade protection is boosted 15% and 1% more light enters the room.

There are many glazing options available, including: highly secure, improved safety, privacy, fade protection, sound block and solar heat block.

Please contact your NK Windows sales consultant if you want a warmer home.