magicseal®

Secondary Glazing for Thermal and Acoustic Insulation of Existing Windows

Cost effective double-glazing

CONTENTS

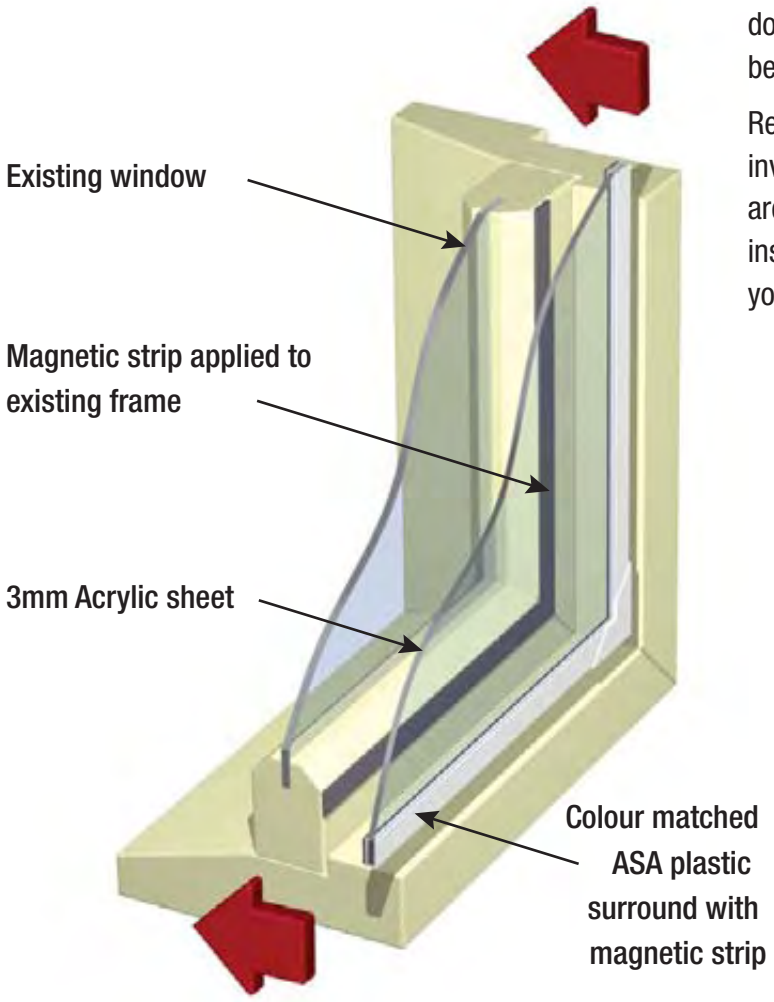
Our Product

MagicSeal uses established double glazing principles with our unique magnetic sealing system to achieve cost effective acoustic and thermal insulation for existing windows.

The insulation benefits of double glazing are widely recognised:

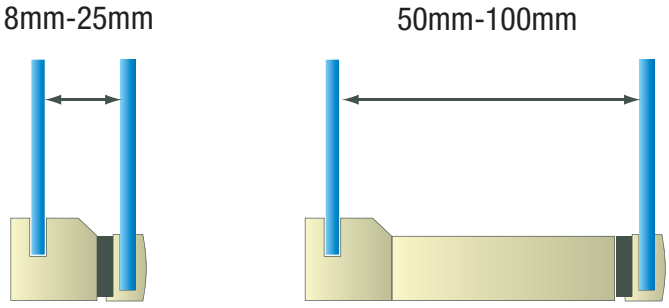
- Heat transfer is significantly reduced, saving money on heating or cooling costs.
- Reduces incidence of 'cold spots' and draughts providing greater home living comfort.
- Condensation problems are greatly reduced saving time on morning mop ups and preventing the growth of unhealthy mould and mildew on windows and drapes.
- Noise annoyance from external sources can be significantly reduced providing peaceful home living conditions.

MagicSeal Secondary Glazing is fabricated and manufactured from premium quality, UV stabilised acrylic sheet and high performance plastics.



MagicSeal Secondary Glazing is fitted to the inside of the existing window, and held in place using MagicSeal's magnetic system. This system traps a layer of still air between the pane of glass and the MagicSeal Secondary Glazing. This trapped airspace will reduce the rate of convective heat loss, and also act as a baffle to reduce sound transmission.

A narrow airspace will maximise the benefit for 'Thermal Insulation' purposes, whereas a wider airspace will maximise the benefits for 'Acoustic Insulation' purposes.



Thermal Insulation

Acoustic Insulation

MagicSeal can double glaze your existing windows for a fraction of the cost when compared with replacement double glazed windows, and will still provide you with the benefits of standard double glazing.

Replacing windows can be a messy and invasive process involving the removal of window frames, re-fitting of architraves and window furnishings. A MagicSeal installation involves the fitting of a discreet second skin to your existing window frames.

MagicSeal Secondary Glazing has four main features that directly benefit the homeowner.

- Noise Reduction
- Heating & Cooling Savings
- Condensation Reduction
- UV Reduction

Acoustic Insulation

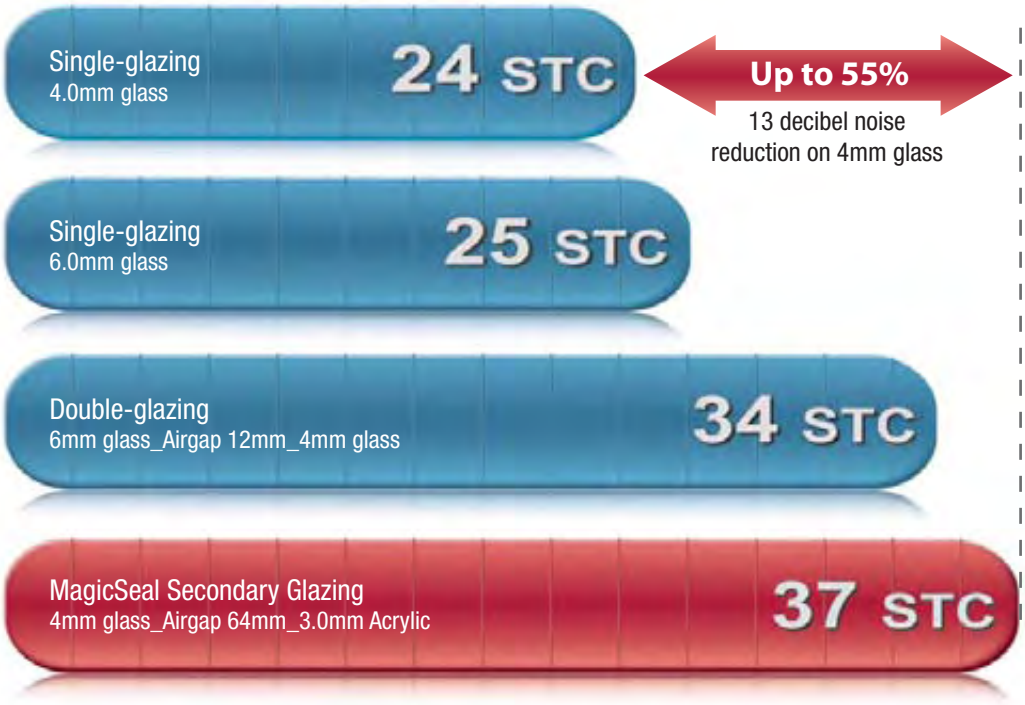
Understanding the mechanics and science behind noise penetration can be complex. Below are some acoustic basics to consider:

1. The human ear perceives a 10dB reduction in noise as a halving of the volume.
2. Noise consists of **level**, **frequency** and **duration** of a sound source.
3. A given 'noise' may comprise many different levels and frequencies of individual sounds.
4. Different materials (such as bricks, timber, glass etc) transmit noise differently – some materials are better at reducing the passage of certain frequencies, due to the different densities of each material.
5. Differing annoyance levels and sensitivities occur for different individuals.

Relative loudness to speech	Sound level (dB)	Perception example
X 16	100	Loud car horn
X 8	90	Very loud heavy traffic - Lawn mower
X 4	80	Noisy office - Inside a bus
X 2	70	Loud busy street - Loud television
Normal speech	60	Noisy normal conversation
X 1/2	50	Average office
X 1/4	40	Moderate quiet office - Library
X 1/8	30	Quiet conversation
X 1/16	20	Quiet room

For acoustic benefits MagicSeal Secondary Glazing is fitted to the existing window in such a way as to maximise the air space between the pane of glass and the MagicSeal panel. For the best results the optimum air gap is between 50 and 100 millimetres. With the aid of our unique magnetic system the large sealed air gap acts as a baffle in which some of the sound making its way through the first pane dissipates after bouncing off the second pane, therefore reducing the amount of sound vibrating through the window.

Sound Transmission Loss of MagicSeal Secondary Glazing [1.2]



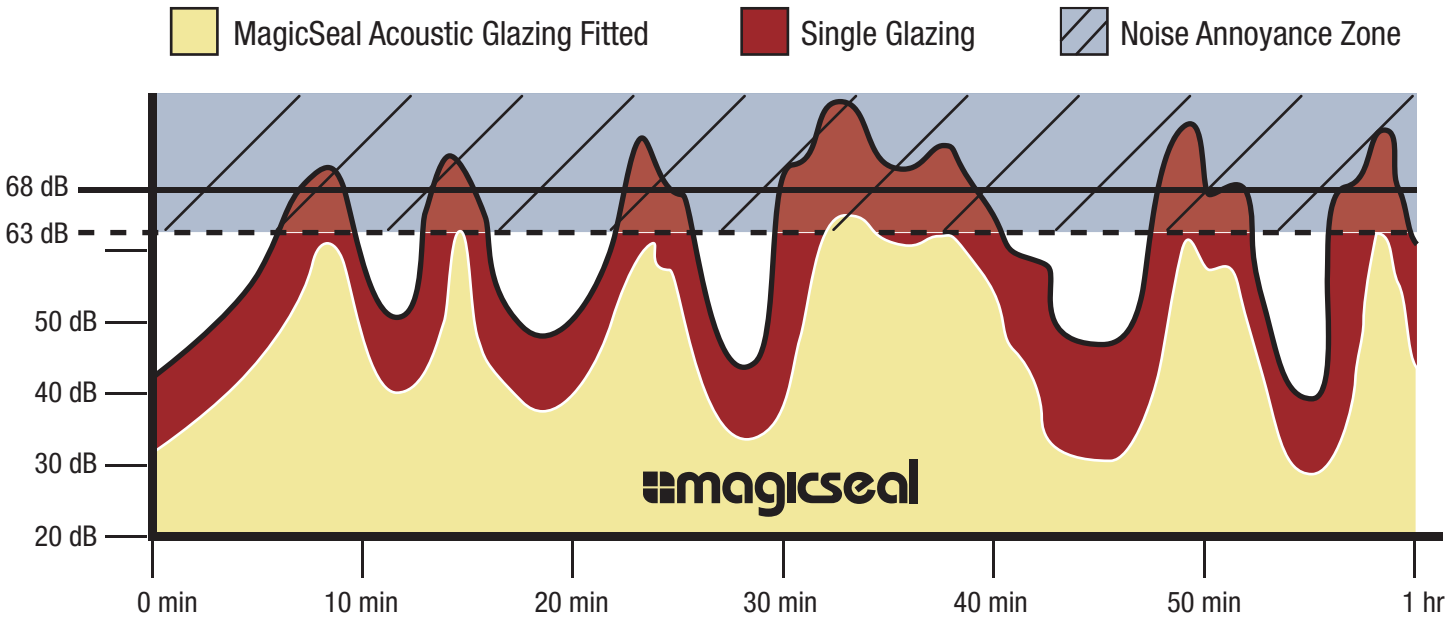
In the building industry sound is measured in Sound Transmission Class (STC). An STC number is derived from sound attenuation values in decibels, tested at sixteen standard frequencies from 125 Hz to 4000 Hz. These decibel values are then averaged into one STC rating. This is an established way to average how much sound walls, floors and roofs stop. There is yet to be an international standard measurement designed and developed specifically for windows. An STC rating of 25 applied to a product will mean that an individual element reduces the sound passing through it by 25 decibels, averaged over the standard frequencies.

1. Dr. John Pearse, Canterbury University, Sound Transmission Loss of MagicSeal Secondary Glazing, January 2000.
2. Dr. John Davy, Guide to the sound insulation of generic types of windows and glass doors. Australian Window Association, April 2000.

Under independent test conditions performed in the Acoustic Laboratory at Canterbury University in the year 2000, MagicSeal achieved a 13 decibel reduction on a single glaze 4mm window. That's up to 55% noise reduction through the window. (See graph on page 3)

The key to understanding the benefits of secondary glazing for noise control is to acknowledge that by taking the edge off the noise will create a more comfortable living environment. In a typical hour sound disturbance may peak and trough as illustrated in the diagram below, but what MagicSeal aims to achieve is knock these peaks down by 5-13 decibels through the window. The sound may peak above the 'annoying' level from time to time, but the cumulative effect of these peaks is lessened over the hour because of the increased accoustic insulation MagicSeal can provide.

Noise Annoyance



So when does noise become annoying?

Many studies have been undertaken to answer this question. A common conclusion is that noise typically starts to annoy people in a day-to-day situation when the sound levels exceed 63 decibels for more than 10% of the time; this is approximately 6 minutes in the hour. When this 63 dB level is sustained for more than 10% of the time or if it rises over 68 decibels, the number of people who will report annoyance increases rapidly.

The level of noise that is considered annoying varies greatly depending on each situation. For example a level above 35dB would be considered 'annoying' in a bedroom at night.

It is important to remember MagicSeal is aiming to achieve a reduction in both the volume and the amount of time that sound is at an annoying level. Any significant reduction is a welcome reduction.

As mentioned a 10dB reduction in noise, can be perceived by the human ear as a halving of volume. So the question arises…"Will my room be only half as loud after MagicSeal is installed?" Sadly the answer is probably not, because there are other sources of noise infiltration, such as eaves, ceilings, floors, and even walls.

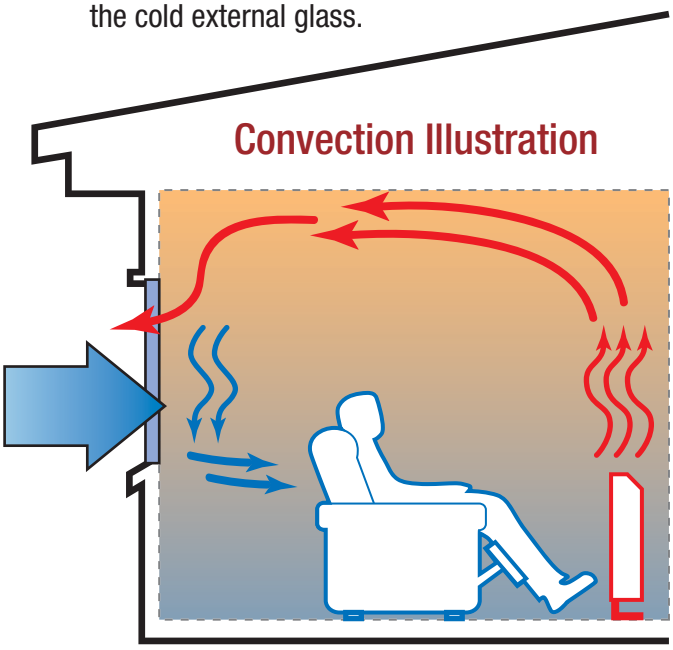
However the weakest point in any house's armour is the noise entering through windows, and that's where fitting MagicSeal acoustic insulation panels can result in significant noise reductions to your living environment.

Heating & Cooling Insulation

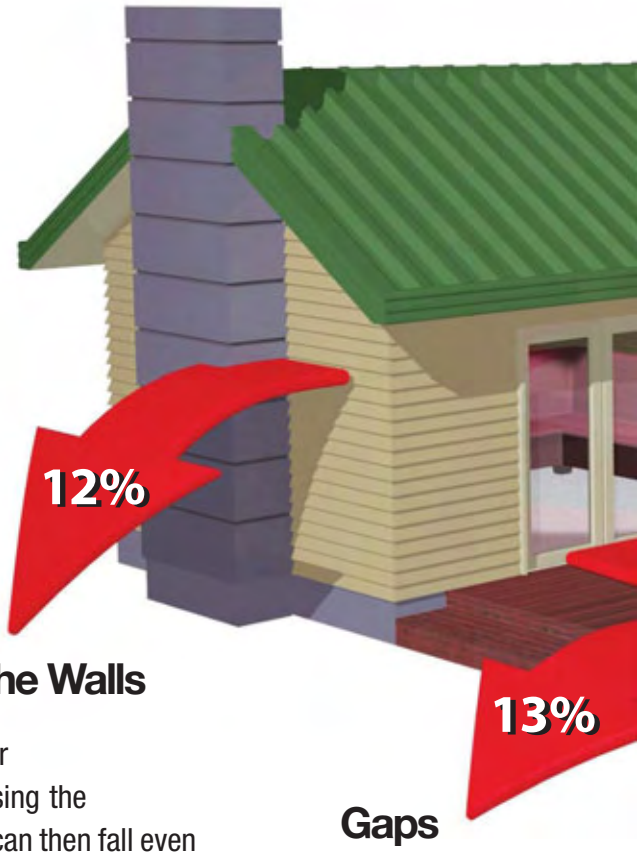
To better understand the process of window insulation the following thermodynamic principles are relevant:

1. Convection is the movement of air circulation caused when warm air rises and cool denser air falls.
2. The convection process is reduced when a narrow airspace is put between the two air movements. The narrow airspace increases the drag between rising and falling air. The net result is that the air falling down the window is not cooled to the same extent, as it would be if it came in direct contact with the cold external glass.
3. Conduction is the process by which heat is directly transmitted through a material when there is a difference of temperature. Glass is a very good conductor of heat and hence cold.
4. Warm air can 'hold' more moisture as water vapour than cold air can.
5. Dew point is the temperature, at which a given parcel of air must be cooled down (at constant barometric pressure) for water vapour to condense into water droplets. Often referred to as dew or condensation.

Convection Illustration



So where does all the heat in your



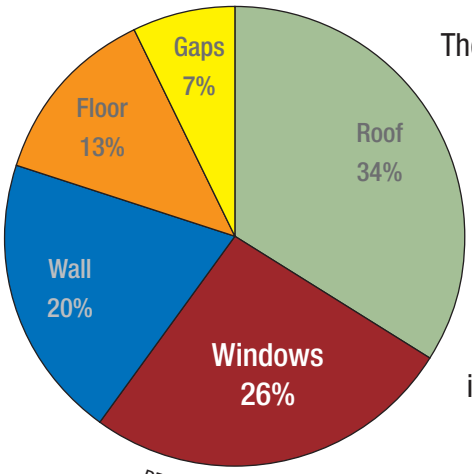
Convection & Conduction

When we heat the air in our homes, the warm air rises straight to the ceiling. This rising air displaces other warm air near the ceiling, which then slowly sinks as it cools, travelling down the walls. When the air travelling down the wall passes a cold window, conduction occurs causing the warm air to be cooled as it passes the cold pane of glass. This cooled air can then fall even faster and often causes a draught effect at the bottom of the windowsill that results in cold spots being felt within the room. This cycle will continue to pull warm air against the window establishing a convection current that will cool your room throughout the day and night.

MagicSeal Secondary Glazing significantly reduces the rate of heat loss because the narrow insulating airspace between the two surfaces is less prone to convection and conduction. A MagicSeal window will still cool the internal falling air but the conduction process is greatly reduced.

MagicSeal use acrylic and not glass because of its superior insulating properties. Acrylic can prevent the transfer of temperature five times better than glass. This is why under similar conditions on a cold day glass will be a lot colder to the touch than acrylic.

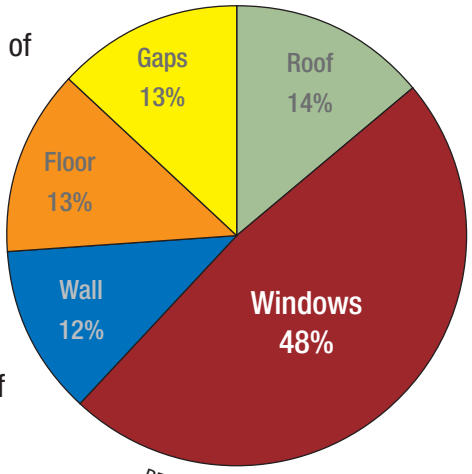
Single Glazed Uninsulated House



BRANZ Report EC0939

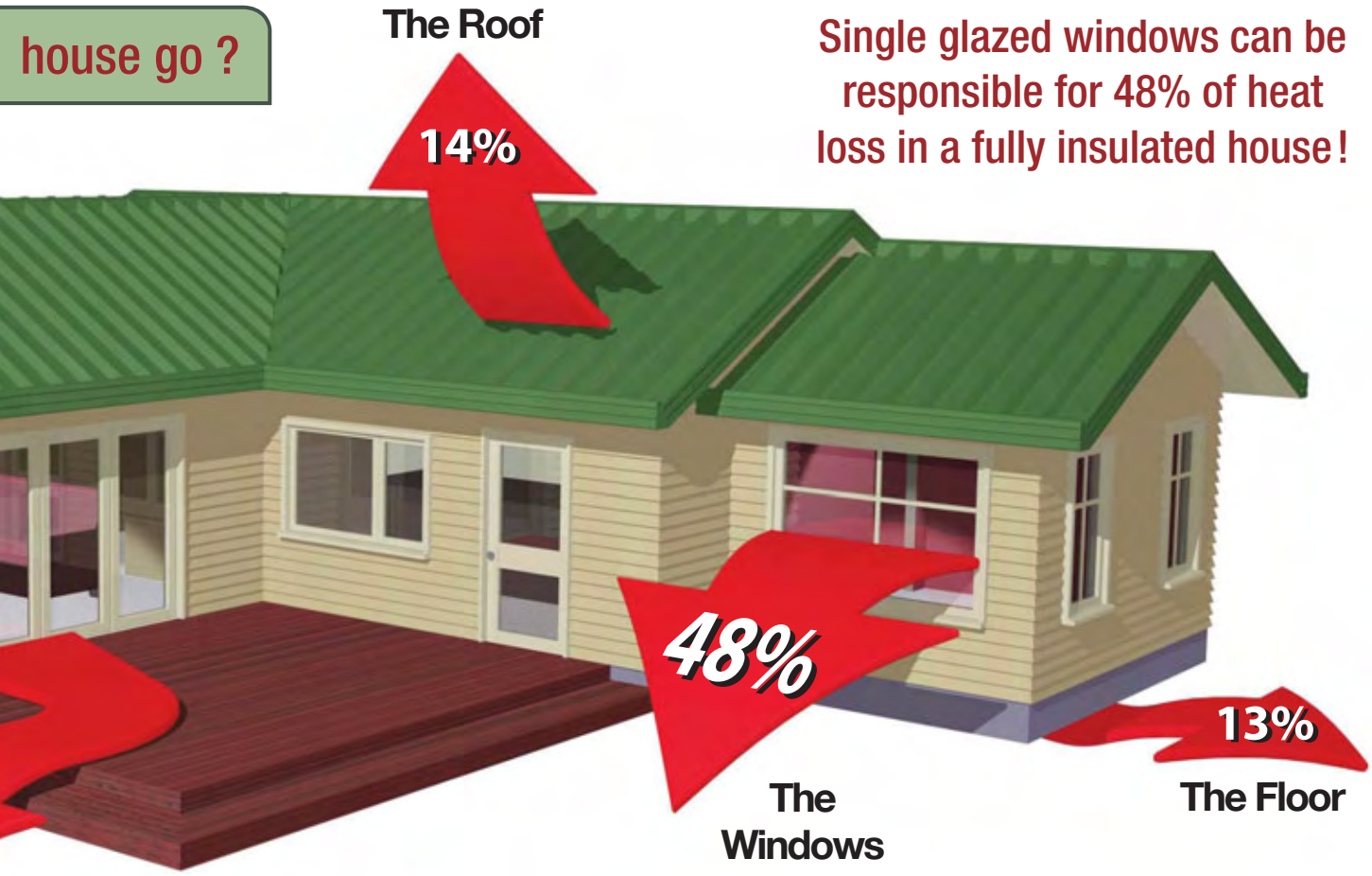
The featured pie graphs are the result of BRANZ research of houses located in the North Island of New Zealand. The pie graph on the left shows percentage heat loss in a house with no insulation. The graph on the right shows a fully insulated house consisting of: Underfloor insulation foil, fibreglass batts in the roof cavity and fibreglass batts in the walls.

Single Glazed Fully Insulated House



BRANZ Report EC0939

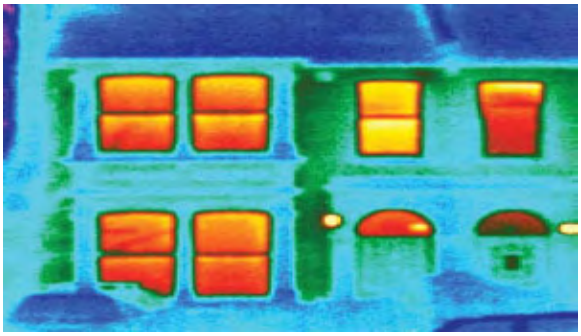
house go ?



Single glazed windows can be responsible for 48% of heat loss in a fully insulated house!

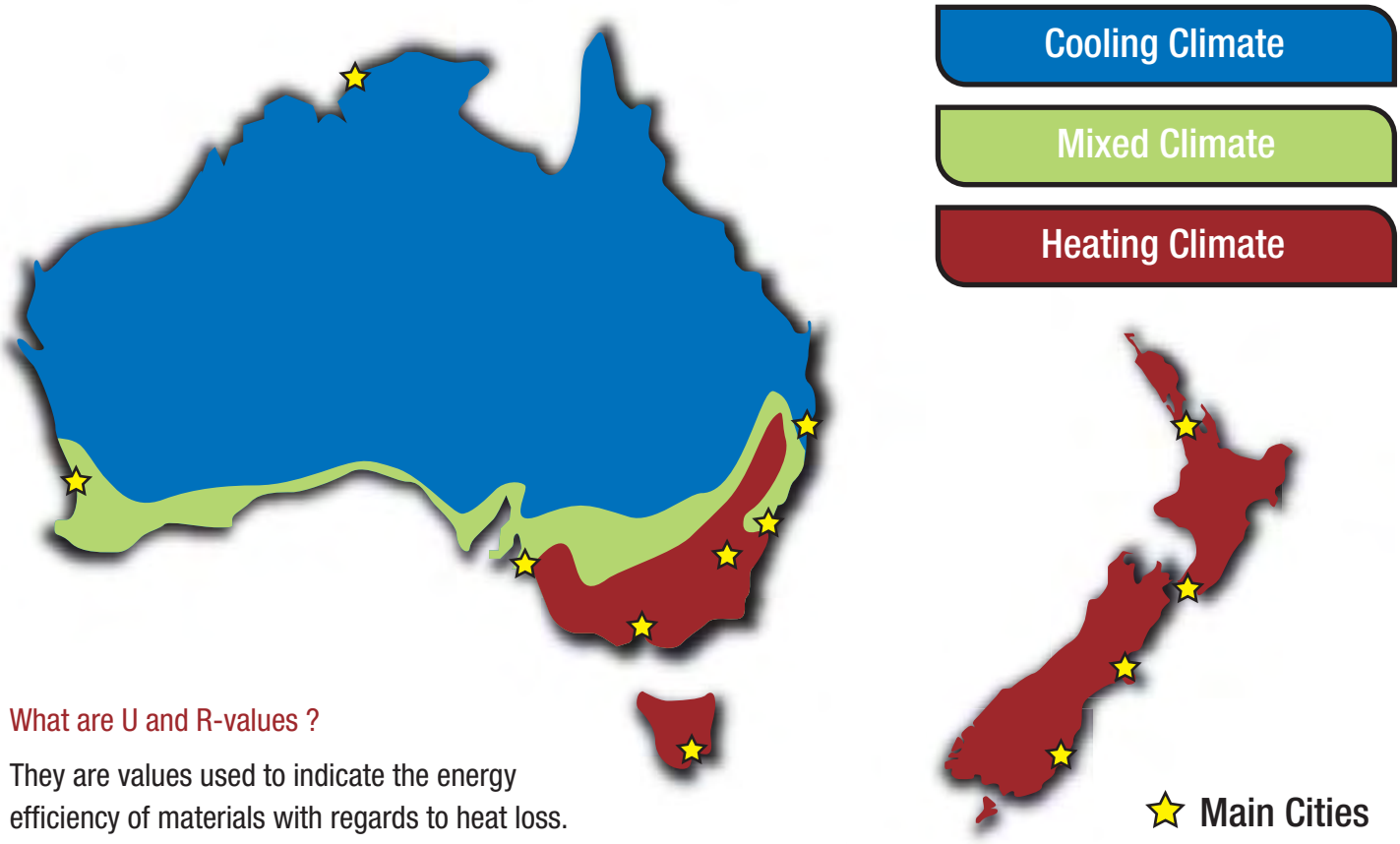
Acrylic can prevent the transfer of temperature five times better than glass.

	Acrylic	Glass
Thermal Conductivity	0.2	1.05



Heat loss. This thermographic image of a house shows the distribution of heat over its surface. The temperature scale runs from red (warmest) through to blue (coldest). This thermo image shows that the roof of this house is well insulated, while the walls and windows are losing most of the heat.

Energy Savings



What are U and R-values ?

They are values used to indicate the energy efficiency of materials with regards to heat loss.
A U-value is the amount of heat transferred or conducted through a material and an R-value is the resistance of heat flow through a material. They are essentially two sides of the coin; one is the inverse of the other. R-values are used to rate walls and ceilings and are applied to individual materials such as insulation batts and gypsum board. R-values do not translate well to windows and other fenestration products. That is why windows are best measured in U-values because they can rate the energy efficiency of the combined materials in a building component or the entire assembly including the airspace.

The lower the U-value, the better the insulating performance will be.

4mm Single Glaze	Double Glaze 4/6/4 Air fill	4mm Single Glaze + 3mm MagicSeal
5.80	3.14	2.70

Single glazing typically has a U-value of approximately 5.8, double glazing starts at 3.14 and decreases. MagicSeal has been calculated to have a U-Value of 2.7, lower than many types of double-glazing. This means MagicSeal can achieve up to 54% less heat loss through your windows if applied to single glazing.

MagicSeal works just as effectively in a cooling climate as it does in a heating climate. It can prevent the heat from coming in on a scorching hot summers day making your home more comfortable and reducing the air conditioning costs. Alternatively in winter it will still let as much of the sun's energy through the windows but trap and stop the warm air from escaping on the cold evenings. Depending on the climate zone and surrounding geographical environment in which you live, energy savings achieved by MagicSeal Secondary Glazing will vary.

So not only will MagicSeal reduce the energy bills within your home, but another important factor to consider here is the extra comfort and wellbeing secondary glazing will bring to your living environment. It has a positive affect on the occupants' general health within a dwelling and what price tag do you put on this?

	MagicSeal Glazing Annual saving per SqM	$$ Savings per M^2 2007 NZ Electricity $0.23 cents per kWh	Estimated Savings In Average House 25 SqM of windows
Auckland	28.1 kWh	$ 6.43 per M^2	$160.75 per year
Wellington	38.6 kWh	$ 8.88 per M^2	$222.00 per year
Christchurch	60.7 kWh	$13.96 per M^2	$349.00 per year
Invercargill	74.8 kWh	$17.20 per M^2	$430.00 per year

The above table is based on an assessment undertaken by EECA and calculated on a timber frame. The figures shown are an estimated calculation and results will vary based on climate zones & window frame types.

Condensation Control

Do your windows look sad and weepy in winter ?

Sick and tired of the morning mop ups ?

As mentioned earlier on page five, warm air holds more moisture as water vapour than cold air. As the falling warm air in a room cools a dew point can be reached.

This will result in the water vapour condensing into water droplets and forming on cold surfaces such as glass. This is often referred to as condensation.

This wet, unhealthy environment can encourage the growth of mould and mildew on the windowsills causing deterioration or rotting. Mould can then spread and appear on wallpaper, curtains and ceilings. These sorts of conditions are not only unsightly but can be detrimental to the health of the occupants living within that environment especially if this process occurs day after day during winter. Greatly decreasing the condensation creates a drier and healthier home in which to live.

MagicSeal Secondary Glazing greatly reduces the volume of condensation occurring and that's got to be better than mopping it up every morning!

Before

After

Solar UV Reduction

Furniture. Carpets. Draperies. Artwork. All of these homely possessions can be severely damaged by fading through your windows.

But what exactly causes fading?

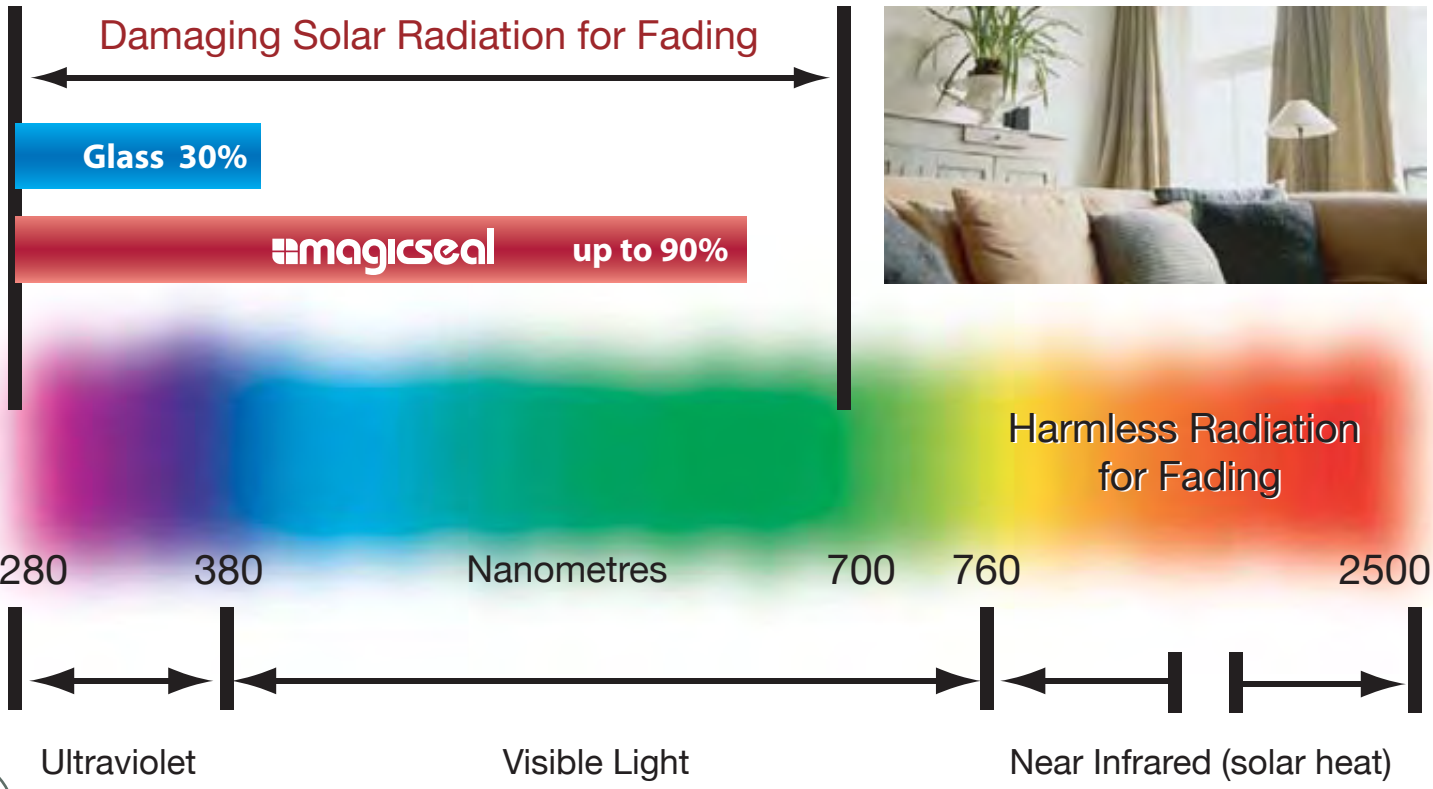
While most people would answer 'sunlight', but in fact majority of fading damage is caused by only a small part of the sun's energy - the portion called ultraviolet radiation. Although ultraviolet comprises only 2% of the sun's energy, it accounts for an approximately 60% of the fading damage to fabrics and furnishings.

Sunlight through windows has long been associated with fabric fading. To suppress fading damage, homeowners often install lined draperies and curtains, shutters, tinted or reflective glass, or dark stick-on window films.
While all of these 'solutions' reduce fading, they also prevent light from passing freely through the window, negating much of the value of having windows in the first place.

An ordinary clear glass window only blocks about 30% of the sun's UV radiation. Solar energy transmitted through glass can be categorised into three main regions: 'Ultraviolet', 'Visible' and 'Near Infrared'. Energy in the spectrum of 280 to 700 nanometres can cause fading of interior furnishings. This region includes all of the ultraviolet energy and most of the visible spectrum and is the best representation of relative fade rates. The balance of the spectrum is harmless with regard to direct fading.

MagicSeal Secondary Glazing is an optical acrylic with added UV inhibitors. This means they can block up to 90% of UV light transmissions while still allowing the natural light in.

The above newspaper was left outside for two days. Standard glass was placed on top and then a small piece of our acrylic was placed on the glass across the bottom left corner. You can visibly see the UV fading to the newspaper through the glass.



Customer Comments

> "We are writing to let you know how pleased we are with the MagicSeal windows you installed recently. They are unobtrusive and blend well with the existing windows. Condensation on the windows was a big problem, but now seems to be a thing of the past. We are also running the heat pump on 17 degrees instead of 22 or 23 degrees with a more even temperature through-out the house. We'd like to thank you for your promptness, punctuality and attention to detail. Thank you for a job well done."
>
> J & F Virtue, Newstead, Australia

This customer had around 11,000 other reasons to be happy – one quotation they had to replace the sashes of their existing windows was over $17,000; MagicSeal did the whole house for just over $5,000.

> "Well I have to say that MagicSeal is 100% better than ear plugs at night. I know that I can still hear things outside but it's as if all the cars have giant duvet's over them. Living where we do has its advantages but the only major down fall is the traffic noise, I truly can't believe the difference it has made putting in MagicSeal. Thanks again, I will recommend you to all our friends."
>
> C Bell, Hobart, Australia

Frequently Asked Questions

I am considering installing one of these ventilation systems to reduce my condensation problems, why should I choose MagicSeal instead?

Ventilation systems use the air in your ceiling space and push it down into your home via a fan and ducting system. If you are looking at installing one of these systems purely for the condensation benefits only, then we would suggest heading towards double glazing because of the added benefits through **energy savings**, **noise insulation**, **UV reduction**, **house re-sale value**, and, the benefits of **condensation control**. The pay back for MagicSeal versus ventilation systems are poles apart. Double glazing will save electricity while reducing your condensation, whereas ventilation systems will use it! However these ventilation systems are very good at recycling the air in your home especially for asthma suffers. Be aware that these systems do use electricity to run the fan units, are only successful in houses with large roof cavities, can take up to two years to fully dry a home out and the dust filters will have to be changed. For a completely dry, healthy and energy efficient home in which to live, MagicSeal would recommend double glazing be installed over a ventilation system as the pay back will be greater.

How do I look after the acrylic panels and clean my windows?

Once your MagicSeal Secondary Glazing is installed we do not recommend you remove it from your windows. The magnetic strip creates a full seal around the frame so no dirt or dust should collect between the glass and the MagicSeal panel. The only two surfaces that will need to be cleaned is the exterior glass and the inside where the MagicSeal panel is fitted. Do not use any alcohol based cleaners on your MagicSeal Glazing. MagicSeal recommends 'Plexus Antistatic Spray' or 'Johnson's Lemon Pledge', as they contain no alcohol. Only ever use a soft cloth for cleaning MagicSeal Secondary Glazing.

Why do you use acrylic instead of glass?

Acrylic has much better insulation properties than glass. In fact, acrylic only lets through about 1/6 the heat of glass. Acrylic is also 18 times stronger and safer than glass and won't shatter.

Can I still open my windows once installed?

Yes your windows will remain completely functional and you will be able to operate them.

Other innovative products by MagicSeal

Magnetic Insect Screens

Retractable Insect Screens for Doorways

Features	Benefits
Heating & cooling insulation	Acrylic is a fantastic insulator when compared to glass and if fitted as double glazing with an airspace will benefit your living conditions considerably. The incidence of cold spots and draughts will be reduced through your windows.
Energy savings	Up to 48% of heat can be lost through windows in a fully insulated house ! MagicSeal has a calculated U-Value of 2.7, meaning that you will benefit from energy savings whether you are heating or cooling your home, year after year.
Condensation reductions	Are your windows sad and weepy in the winter ? The morning mop-ups can become very tiresome every day. With MagicSeal condensation problems are eliminated in most cases leaving your home healthier and free from mould and mildew forming.
Noise reductions	MagicSeal Secondary Glazing will also provide you with reduced noise infiltration for a quieter environment. If you live near a busy road then we can fit our panels for acoustic purposes like ear muffs for your windows !
Colour matched to suit	MagicSeal is custom fitted by professionally trained installers giving you peace of mind. Our product is colour matched to your joinery for an almost invisible finish and we can even achieve a timber grain look for those natural looking frames.
UV fading reductions	Living 'down under' does have its benefits, but one draw back is the hole in the Ozone above Antarctica. This means we see 40-50% higher UV radiation levels. MagicSeal can block up to 90% UV protecting your carpets, furniture, draperies and artwork.

Your local agent is

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