

slimlite Self-cleaning Double Glazed Units

Self-cleaning glass the latest permanent Hydrophobic Nanostructure
innovation for Slimlite Double Glazed Units
TEN YEAR GUARANTEE

A First Class Quality Product
Double Glazed Units
Slimlite



SLIMLITE CHANGES THE FACE OF DOUBLE GLAZING

Slimlite Self-cleaning has an invisible glass coating which forms a permanent covalent fused bond to the glass at a few atoms thick nanoscale structure which cannot be removed by water cleaning agents or high pressure equipment and is more scratch resistant than ordinary glass and improves Light Transmission by about 2%.

The nanoscale coating is water and dust repellent and dramatically changes the rain water sheeting effect to a small scattered globule effect improving vision and accelerating the downwards action of the globules carrying away most surface dirt, depending on the amount of rain.

The nanoscale coating changes the original glass surface from Hydrophillic (Water Loving) to Hydrophobic (Water Hating) activating a self-cleaning action.

Self-cleaning action *Let nature do the work*

City Of Edinburgh - Listed Buildings

Edinburgh City Council, Historic Scotland and Edinburgh World Heritage have approved the use of Slimlite Double Glazed Units for A Listed and B Listed Buildings in Edinburgh which has the largest stock of Listed Buildings of any City in the UK except London.

Slimlite Double Glazed Units are Premier Quality Units with high guaranteed gas content and insulation value. Light Transmission 75% Ultra Violet Transmission 36%, Solar Gain 67% and edge taped for extra protection.

“ It is not often that I get completely blown away by a building product, but I find this absolutely extraordinary, looks like a single pane of glass. ”
Kevin McCloud
Grand Designs TV 2009

SashGlass Slimlite Double Glazed Units

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SLIMLITE DOUBLE GLAZED UNITS ARE PATENT PROTECTED PRODUCTS Granted UK Patent Slimlite®

Specialist slimlite double glazed units - reproduction crown sheet



slimlite Self-cleaning Double Glazed Units

slimlite Double Glazing the original patent innovation of the new very slim units with a very small perimeter edge seal of only 5mm for fitting to most existing single glazed windows or new windows to maintain the desired appeal of the slim glazing bar or astragal have now introduced another Self-cleaning aspect to Slimlite for the external glass.

Self-cleaning refers to the ability of a nanostructure invisible coating applied to the glass a few atoms thick which forms a permanent covalent fused bond to the glass. This has the effect of changing the glass surface from Hydrophillic or 'Water Loving' to Hydrophobic or 'Water Hating'

This changes the water sheeting effect of the rain on the glass to a scattered spherical or globule effect from the rain and the 'Water Hating' glass surface encourages the water globules to run downwards, carrying away any dirt or atmospheric contamination leaving the glass reasonably clean. The scattered globule effect over the surface of the glass has the surprising effect of substantially increasing visibility during the rain.

slimlite Self-cleaning Double Glazed units are guaranteed for a period of 10 years. See detail on glazing and cause of unit breakdown.

Incredible Clear Vision During Rainfall



This naturally hydrophobic phenomenon can be seen on the leaf of a Lotus Plant and similarly on a Nasturtium leaf where the rain will form globules or spherical shapes which run off the leaf carrying away dust or dirt.

See simulation on our website at:
www.sashglass.co.uk/self-cleaning-glass.html

Lotus Leaf



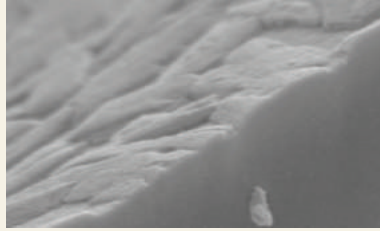
Hydrophobic Glass



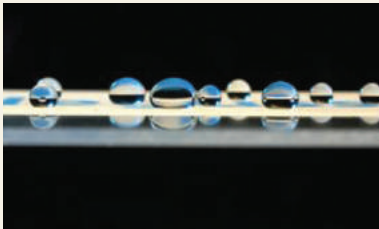
slim Double

Most people assume that normal glass is smooth which is not the case as can be seen from microscopic photograph.

Rough Surface



Coated Glass



The amount of rain will affect the self-cleaning action. Heavy rain will accelerate the self-cleaning and light rain more slowly effective and a fog like atmosphere may provide insufficient moisture to activate the self-cleaning action, or may leave tiny globules of rain water which are too small to drain downwards and will dry off naturally and may occasionally leave small specks if the atmosphere is fairly heavily contaminated.

Whilst the nanostructure coating is also dust resistant, when there are long periods of dry weather and there is atmospheric contamination, the glass because of the Hydrophobic properties, enables the glass to be cleaned easily with a spray of water or hosepipe. Self-cleaning does not mean totally maintenance free particularly when heavy pollution occurs with insufficient rain. Similarly where windows are sheltered from the rain or where the top part of a window is also partly sheltered a spray of water or hosepipe is all that is required to complete the cleaning action.

Where there is sufficient rain the Hydrophobic properties of the glass coating will always ensure reasonably acceptable clean glass other than in sheltered areas.

Existing Glass in Buildings

It is also possible to have the Hydrophobic coating applied to existing glass in windows. As the glass is termed 'old glass' it requires a special cleaning process before application of coating to provide the same invisible permanent covalent fused bond to the glass, to provide the Self-cleaning Action.

Vehicle Windscreen

- Incredible Hydrophobic Effect

An application of this Hydrophobic Nanostructure coating to a windscreen improves visibility during rain by 30% and improves driver response by 25%. (Independent Study)

Windscreen Guarantee 2 Years
Side Windows 5 Years

See video on our website at:

www.sashglass.co.uk/self-cleaning-glass.html



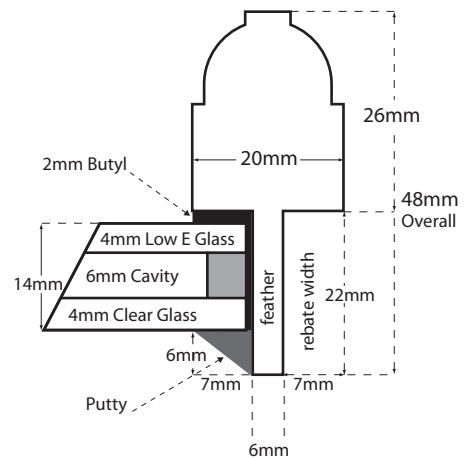
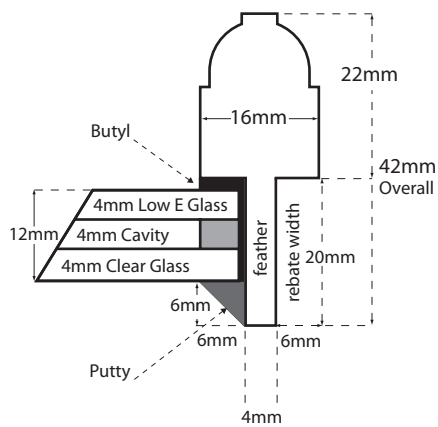
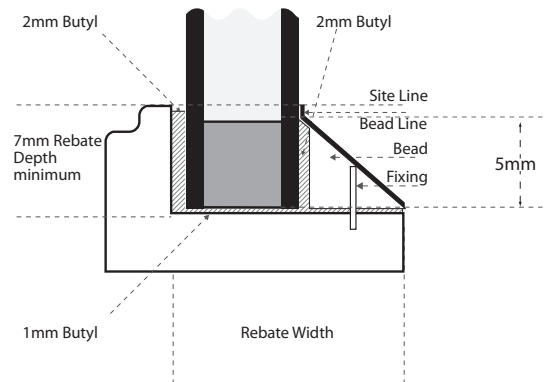
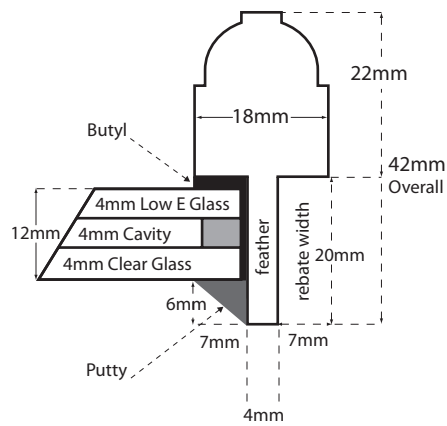
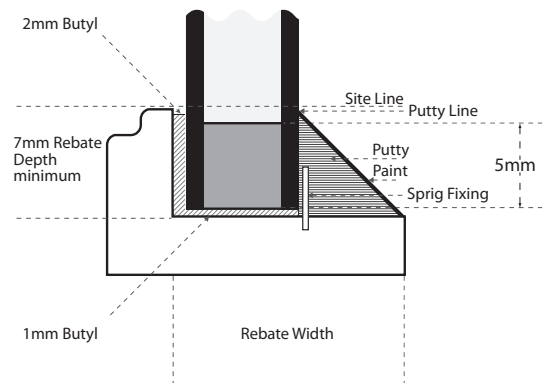
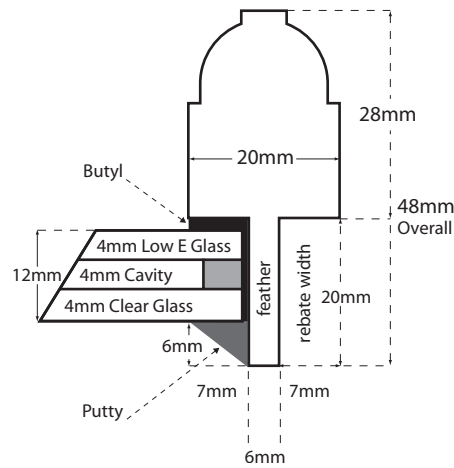
Self-Cleaning Glazed Units



slimlite Self-cleaning Double Glazed Units

- Nominal Cavity Widths: 3.0mm - 4.0mm - 5.0mm - 6.0mm - 8.0mm - 10.0mm. Other cavities and triple cavities on application.
- Standard overall Perimeter Seal Depth - 5.0mm (overall tolerances + or - 1mm)
- Minimum timber rebate depth - 7.0mm

Section Standard astragal or glazing bars with Slimlite (not to scale).



Overall window U Value 1.6

Note

Glazing sizes should be less 2 or 3mm from height and 2 or 3mm from width. Allowance should be made where frame sizes are irregular.

Certification CE BSEN1279 APPROVED

To manufacture double glazed units, certification is required for BSEN1279 Part 2, production quality and BSEN1279 Part 3, which relates to gas leakage at less than 1% per annum.

slimlite Certification

Certificate BSEN1279 Part 2 BSI 262/4677672 (Production Quality)

Certificate BSEN1279 Part 3 BSI 371/7758378 (Gas Leakage)

Certificate BSEN673 UKAS Certified U-Value (Insulation)

Certificate BSEN150 8990. National Physical Laboratory Thermal Transmittance

Safety Glass Standards

Toughened glass, Class 1 BSEN 12150

Laminated glass, Class 2 BSEN 14449

Constructed 3 or 4mm Low E/3.0mm Cavity, gas/3 or 4mm clear float or Reproduction Crown	U Value 2.1	9mm, 10mm, 11mm
Constructed 3 or 4mm Low E/4.0mm Cavity, gas/3 or 4mm clear float or Reproduction Crown	U Value 1.9	10mm, 11mm, 12mm
Constructed 3 or 4mm Low E/5.0mm Cavity, gas/3 or 4mm clear float or Reproduction Crown	U Value 1.7	11mm, 12mm, 13mm
Constructed 3 or 4mm Low E/6.0mm Cavity, gas/3 or 4mm clear float or Reproduction Crown	U Value 1.4	12mm, 13mm, 14mm
Constructed 3 or 4mm Low E/8.0mm Cavity, gas/3 or 4mm clear float or Reproduction Crown	U Value 1.3	14mm, 15mm, 16mm
Constructed 3 or 4mm Low E/10.0mm Cavity, gas/3 or 4mm clear float or Reproduction Crown	U Value 1.2	16mm, 17mm, 18mm

Warm Edge Spacer

It is generally considered that warm edge spacer used in Slimlite Construction will improve current centre pane stated U Values by 0.1 - 0.2.

Triple slimlite Double Glazed Units available on application.

slimlite – Gas Content-Gas Leakage Certificate BSI 371/7758378 Krypton/Xenon inert gas

Double Glazed Units have a gas leakage rate and are required to have a gas leakage certificate at a rate less than 1% per annum which is BSEN1279 Part 3. The standard gas fill required is 90%, but Slimlite has an average gas fill of 96.5% and certified average leakage loss at 0.77% per annum. Therefore Slimlite has approximately 7% more gas over a period of 10 years at 89.32% and 20 years at 82.67% compared to a standard unit gas 90% fill with resulting loss at 79.33% at ten years and 74.33% at 20% years. Loss of inert gas will decrease the insulation of a double glazed unit which is important in today's escalating energy costs.

slimlite Double Glazed Units a Certified Quality Product

Low E Glass explained

Low E Glass is short for Low Emissivity glass which is an emissivity coating either forming part of the glass or applied to one face of a glass pane. This reflects part of the long wave radiation or heat back into a room.

Hard Coat Low E Glass

Hard coat is referred to as Pyrolytic which means it is applied during glass manufacturer forming a permanent part of the glass which is hard and therefore referred to as Hard Coat.

Soft Coat Low E Glass

Soft Coat is an emissivity coating applied to glass after manufacture by vacuum deposit, which is soft not forming part of the glass and therefore referred to as Soft Coat.

All Slimlite units are manufactured with Hard Coat Low E unless otherwise requested. All emissivity glasses have a slight tint.

Guarantees

slimlite Hard Coat - 10 year guarantee

slimlite Soft Coat - 5 year guarantee

Reproduction Crown Glass - Historic and Heritage applications (see indicative illustration on back page).

Dummy Glazing Bars or Astragals - See Pilkington UK Technical Bulletin Ref M17 Date 13 October 2011.

Sound Reduction and U-Values

Sound reduction with double glazed units is an increasing concern for clients and specifiers to improve habitations where noise is a problem, generally in heavily populated areas.

Slimlite Double Glazed Unit cavities are filled with a mixture of Krypton and Xenon inert gases which are much heavier than the standard Argon and therefore provide much better sound reduction than standard units. The widths of cavities has little or no effect on sound reduction. Therefore each cavity will have the same effect.

Sound reduction in standard double glazed units 2 panes of 4mm glass with Air Cavity - 25 Decibels.

slimlite Double Glazed Units - Sound Reduction (Acoustic Insulation)

Constructed:

Example: Normal noise reduction $RW = 31$ Decibels - Traffic $C_{tr} = 27$ Decibels

4mm Low E/4mm Cavity, gas/4mm clear
 4mm Low E/5mm Cavity, gas/4mm clear
 4mm Low E/6mm Cavity, gas/4mm clear
 4mm Low E/8mm Cavity, gas/4mm clear

31 Decibels, Traffic 27 Decibels, U-Value 1.9
 31 Decibels, Traffic 27 Decibels, U-Value 1.7
 31 Decibels, Traffic 27 Decibels, U-Value 1.4
 31 Decibels, Traffic 27 Decibels, U-Value 1.3

Other Constructions - Sound Reduction

Constructed:

6mm Low E/4mm Cavity, gas/4mm clear
 4mm Low E/4mm Cavity, gas/6.8 Optiphon
 4mm Low E/4mm Cavity, gas/10.8 Optiphon

33 Decibels, Traffic 30 Decibels, U-Value 1.9
 35 Decibels, Traffic 31 Decibels, U-Value 1.9
 38 Decibels, Traffic 34 Decibels, U-Value 1.9

Sound is measured over a range of frequencies and sound reduction is shown in Decibels, and a 3 Decibel reduction in sound will be very noticeable.

The higher decibel figure reflects increased sound reduction.

Sound Insulation ISO 717 (1982)

Issued by University of Salford (Acoustics Test Laboratory) UKAS ACCREDITED TEST LABORATORY NO. 1262

Client: Slimlite Double Glazing **Test specimen mounted by:** Client **Description of the specimen:** 4mm/4mm, cavity gas/4mm

Product identification: Double Glazed Unit **Test room identification:** Small Reverberation Room / Large Reverberation **Date of test:** 08-07-09

Size: 0.589 m² **Mass per unit:** 18 kg/m²

Temperature [°C]: 21.9 **Humidity [%]:** 50.4

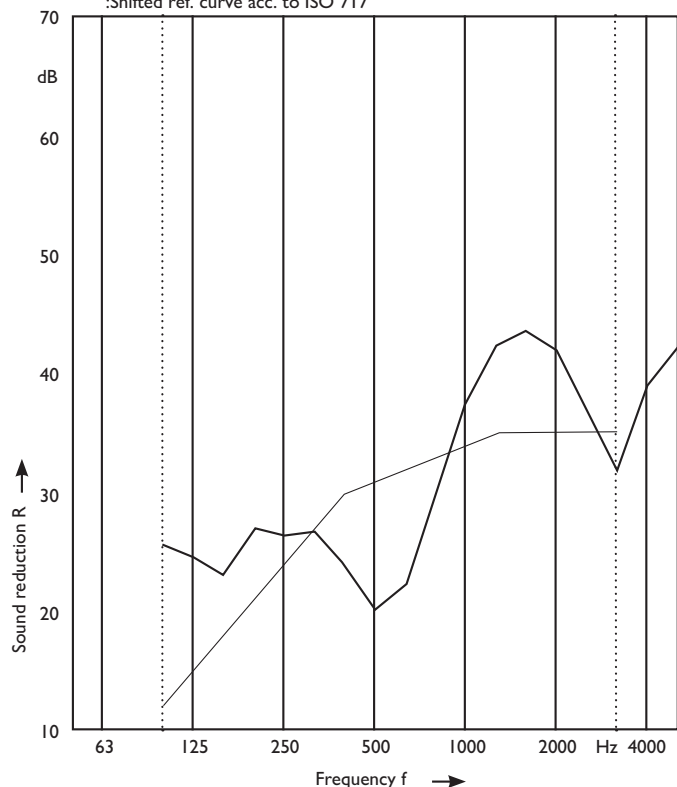
Source room Volume: 136 m³ **Receiving room Volume:** 220m³

Frequency [Hz]	R 1/3 oct. [dB]
50	--
63	--
80	--
100	25.7
125	24.6
160	23.1
200	27.1
250	26.5
315	26.7
400	24.0
500	20.1
630	22.4
800	30.7
1000	37.9
1250	42.3
1600	43.7
2000	41.9
2500	37.3
3150	32.2
4000	39.1
5000	42.2

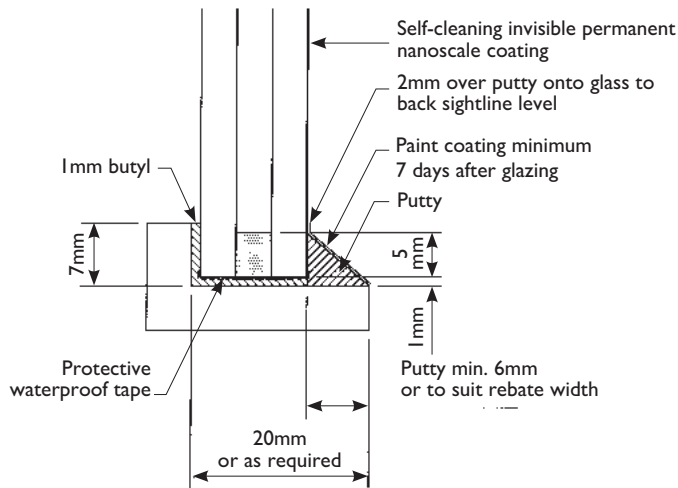
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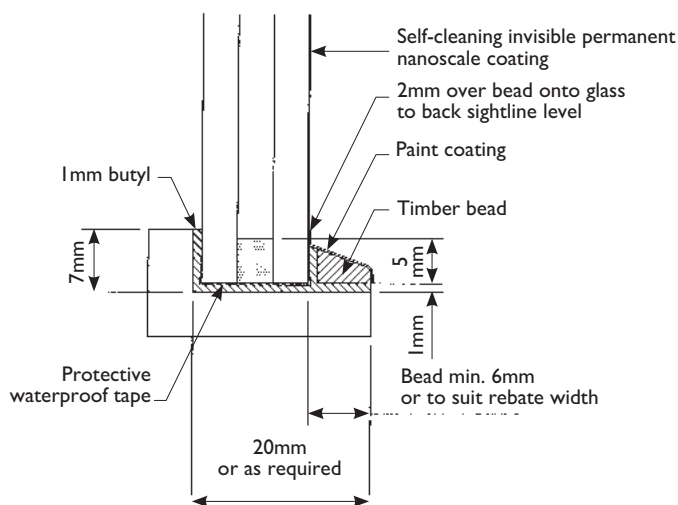
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slimlite glazed with putty & butyl



slimlite glazed with beads & butyl



Double Glazing Breakdown or Misting

This is caused by failure of the glazing method which must protect the unit seal from the ingress of water or moisture. All double glazing sealants used in the manufacture of double glazing units have a moisture vapour transmission rate when exposed to water or moisture, which will cause misting or breakdown eventually over a period of time. Where units are foreputtied, the putty must be painted and on to the glass to provide a seal to protect the putty from moisture ingress. Foreputty should be left for 7 to 10 days before painting and within 28 days. Similarly when glazed with beads and non hardening compound, paint or protective coating should be applied over the bead and on to the glass. Where timber preservative has been used, Manufacturer's instructions should be followed to prevent reaction with glazing compound. All Slimlite Self Cleaning Unit are edge taped with a strong adhesive aluminium foil which helps to avoid damage during handling, but most importantly provides some extra protection should glazing failure occur allowing ingress of water or moisture.

It is recommended that timber windows should be painted every five years Inland areas and three years Coastal areas. However it is recommended that the paint protection of the glazing including the overlap on to the glass face, should be repainted every three years to maintain the required protection particularly with putty fronting as a minimum. However more frequent 'spot painting' may be necessary to maintain the required standard of protection.

BS6262 Section 9.3.2.4.2

BS6262 Section 9.3.3.2



Construction Materials of Slimlite Double Glazed Units

Slimlite is probably the most innovative product to arrive in the Double Glazing Industry for many years and was achieved by utilising the very latest technology and best products available.

Glass

There are two types of emissivity glass referred to as (Low E), Soft Coat and Hard Coat. Soft coat is applied to one face of the glass often manufactured by vacuum deposit. The other hard coat is applied to the glass during manufacture and forms part of the glass. Hard Coat is the selected Low Emissivity glass for Slimlite and should provide long term stability.

Spacer

Super Spacer is a North American, structural foam spacer with integral drying agent and is referred to as warm edge technology. This ensures there is no significant thermal difference around perimeter edge of unit, with significant advantages over other spacers, and is considered to reduce the calculated U Value by 0.1-0.2.

Sealant - Bostik 5000 Insulating Glass Sealant (Approx.) Typical Performance

Moisture Vapour: <math><0.1\text{g/m}^2\text{ per day for 2mm film}</math>
Transmission Rate: at 25°C (77°F), 100% RH.
(ASTM method E96)

Inert Gases

Krypton and Xenon are the best inert gases on the market, particularly for small cavities. They are also heavy gases, which is reflected in the superior sound reduction figures for Slimlite and additionally provide very good thermal insulation but are more expensive than Argon used in standard units.

Most manufacturers use Argon, a very light inexpensive gas which has little or no effect on sound reduction.

Solar Gain

Everyone knows that when the sun shines through a window, the room heats up from solar gain. This solar gain now forms part of the energy calculations to improve window energy ratings. There is therefore a desire to improve the solar gain through a double glazed unit by using glass with good solar gain, to increase the overall window rating.

However double glazed units in general are now providing much better insulation which substantially reduces heat loss and therefore any lengthy exposure to solar gain from large areas of double glazing can cause a room to become extremely hot as evidenced in conservatories requiring blinds, as heat cannot escape fast enough. A very important factor when choosing double glazing.

slim
Double



General Information on Heat Loss in Glazed Timber Sash & Case Windows

Single glazed timber sash and case windows are very poor at conserving energy. The heat loss through single glazing which has a U-Value of 5.8 is around 70%.

This is caused by the single pane of glass which will be at approximately the same temperature as it is outside. In colder conditions in a room at around 20 degrees centigrade, the warm air will contact the cold single glazing and drop downwards at a rate exceeding two metres per second, sometimes mistakenly considered as a draught through window construction joints.

This causes a constant convection in a room where the air is being heated and then cooled by the cold single glazing, resulting in an expensive, continual 70% heat loss, through the glass.

Low E Double Glazing such as Slimlite reduces this heat loss by at least 50%, due in part to the Low E glass which reflects the long wave radiation or heat back into the room, combined with the insulating inert gases contained in the cavity of Slimlite, Krypton and Xenon, which are the most effective inert gas insulators.

The insulating effect keeps the inside pane, normally the Low E glass much warmer than the outside temperature, thereby considerably slowing down the convection mentioned above and reducing heat loss by around 50%.

Recent figures estimate that Low E double glazing such as Slimlite because of the escalating costs of energy will provide a pay back term of 3 to 5 years, depending on the insulation value.

Replacement of one square meter of single glazing by Low E double glazing will provide a saving of approximately 90Kg of carbon dioxide emissions per year.

The very design of sash and case windows permit the ingress of air which does not affect the thermal performance of Slimlite double Glazing. However a good quality draught proof system should reduce the draughts by around 80%.

Document L England - Section 6 Scotland

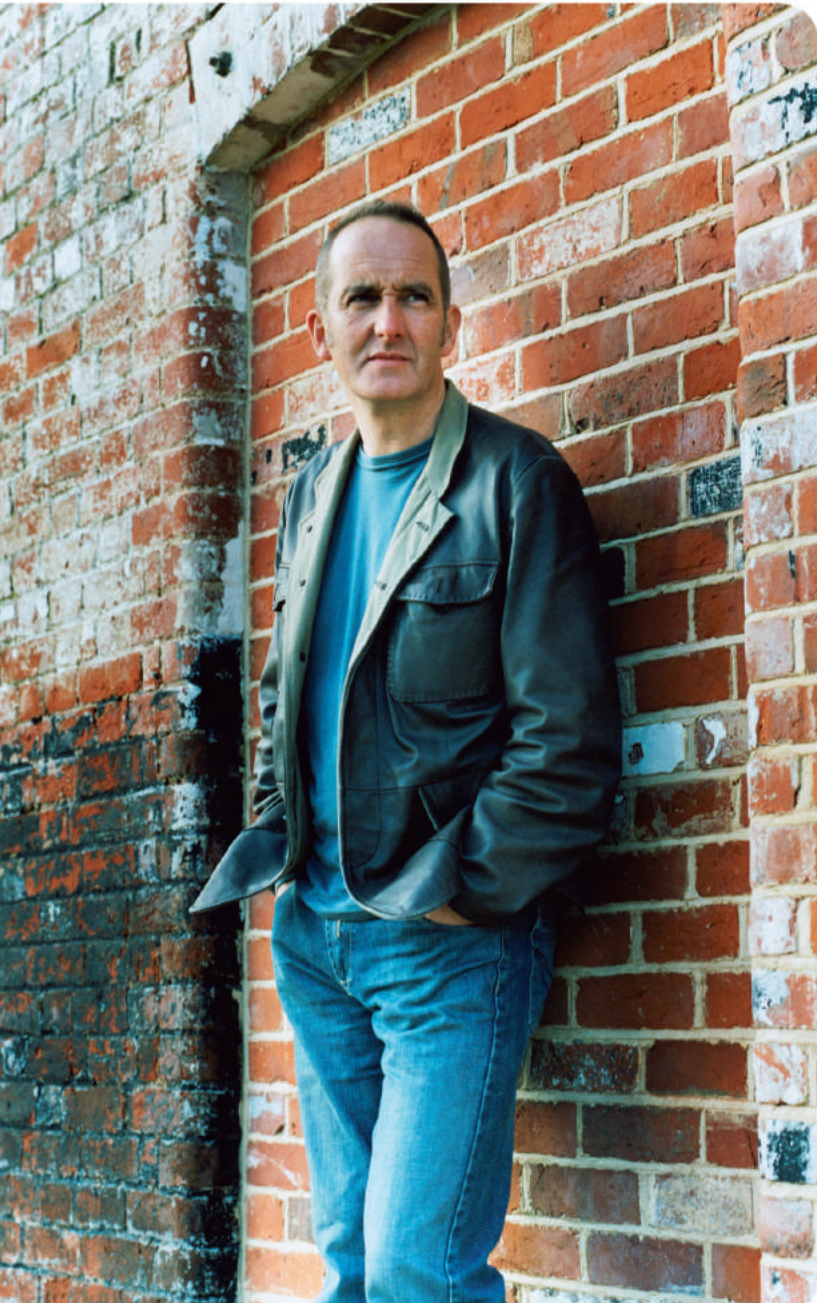
These new insulation requirements for windows are a result of the Kyoto Agreement to reduce carbon emissions and bring to an end the poor insulation of single glazed windows except for Listed Buildings. However Edinburgh have recently made a major policy change allowing replacement double glazing such as Slimlite to A and B Listed Buildings. Edinburgh has more Listed Buildings than any other City in the UK except London, other City Authorities may well consider their current policies.



lite Glazed Units

Period drama

Continuing his new series on building materials, **Kevin McCloud** looks at ultra-thin double-glazing that's perfect for historic windows



Without glass we would be either extremely cold or stumbling around at home in the dark bumping into each other. Glass is the great revealer of light and shade in our buildings; without it there would be no interior design. Think about it – decorative wallpaper depends on an amorphous solid formed by melting then cooling sand.

The invention, not just of glass, but of framing systems, double glazing, special metal oxide coatings to reflect heat, gas-filled voids and silicone sealant have, in the past fifty years, been responsible for one of the most insidious conditions of the modern age: an addiction to light.

Anybody building an office block, hotel or house instructs their architect that their building must be 'flooded' with light. Or 'inundated', or 'pooled'. Glass allows us to wash our architecture clean in the light of the sun and scour our souls. Forget brick, harbinger of gloom.

Unless you live in a listed building, of course. Or in a conservation area. Or in one of the several million Georgian, Victorian and Edwardian homes in Britain with modestly sized windows. Traditional homes are often gloomy in parts, not least because we hang curtains, fit shutters and put up blinds, partly for privacy, but partly in an attempt to keep the heat in the building. My own house has tiny windows set into stone walls half a metre thick. This has resulted in an addiction to gloom.

To make matters worse, the conservation culture that pervades Britain is so violently opposed to fitting energy-efficient double glazing to our listed buildings that we're all forced to hang curtains made from old duvets and candlewick bedspreads.

I do have a lot of sympathy for the conservation viewpoint, however. One of the principles underlying conservation theory in this country is that of minimal intervention: replace only the essential. A properly maintained Victorian terraced house with its original front door, cast-iron rainwater goods and fine sash windows is a handsome thing. A rare breed these days in your average street full of bastardised mutant houses. Moreover, if you've ever stood in a period house that's been fitted with uPVC double glazing, you'll know that the frames often leak and that the plastic is so weak and flimsy the only way the window stays in place is by beefing up all the sections of it so that the bit of glass ends up being half the size of the original. When they say 'replacement double glazing' they mean they're going to replace your glass with some thick white plastic that creaks.

So you would think that conservation officers across the land would rejoice at the news that it is now possible, after decades of research, to replace a cracked single pane of glass with a highly efficient panel of super-micro double glazing. A panel so finely detailed and slim (at 10 or 12mm thick) that it can be puttied into a Victorian sash or a finely carved Georgian lamb's-tongue glazing bar and not be noticed. A panel that can be heat-treated to give a subtle warp to the surface to mimic the hand-blown crown or cylinder glass of yesteryear. A panel so brilliantly made that it turns a cold, inefficient period window into one that is condensation-free and that meets current building regulations – with a U-value of just 1.8.





Trade secrets
 Radar
Kevin McCloud
 Report
 Building blocks
 Ask our architect
 Green guide
 Expert advice
 Self-build planner
 Insider guide
 On the market

left Ian and Sophie Cooper used Slimlite double-glazing units to restore the windows of their former mill storehouse in Somerset

A wall's average U-value is 0.3; single pane glazing has a miserable value of between 5 and 6. This new double-glazing system, invented by a man called Jim in Edinburgh and sold by his company, Slimlite, matches the performance of standard double glazing thanks to its metal coated surface and a mixture of krypton and xenon gases in the tiny gap. In larger spaces these gases start to form convection currents, breaking down their insulating usefulness, but in a small void they're highly efficient.

But such carbon-conscious information has no appeal for conservation officers and the likes of English Heritage inspectors. There is currently a wall of rejection of this new technology in this country as the conservationists hide behind the duvet curtains. I agree that wherever possible the original fabric of a building needs to be conserved and retained. But globally we face climatic changes in the next hundred years that will affect both how and whether we value our historic environment, and threaten the structural integrity of many of our old buildings. Better to intervene now and make them more energy efficient by draughtproofing, insulating and double glazing them with this system, than allow them to contribute to global meltdown. Edinburgh has taken a lead in allowing the retrofitting of Slimlite to historic buildings; Bath Council has approved it for Ian and Sophie Cooper's historic industrial building (featured on *Grand Designs*, see page 66), but that's not enough.

Two per cent of our housing stock is listed. Piffing, you might say. But every time a conservation officer works with a homeowner to make a historic home more energy

Slimlite double glazing

Advantages

- ◆ Slimlite's double-glazed units are just 10-12mm thick, which allows them to be fitted to most existing single-glazing openings
- ◆ The units offer excellent insulation due to the thermally efficient inert gas (xenon or krypton) sandwiched between the two panes of glass
- ◆ Low-emissivity glass used for the inner pane reflects heat back into the room
- ◆ Replacing one square metre of single glazing with low-E double

glazing will give you a saving of approximately 90kg of carbon dioxide emissions per year by cutting down on heat loss, which will, of course, save you money on energy bills

Disadvantages

- ◆ They are not yet widely accepted by conservation officers for use in period buildings
- ◆ The cost may put you off - Slimlite double glazing costs around 60-70 per cent more than standard units. Prices start at £34 for a small (0.3sqm) window

efficient it informs local practice. In fact nearly 20 per cent of all our homes were built before 1918; 38 per cent were built before 1944. And when you realise that the vast bulk of the homes we'll be living in in 2050 are already built, you'll understand why we need to think creatively about adapting our homes to low carbon use. Which is why *Grand Designs Magazine* is launching the Great British Refurb campaign, working with the UK Green Building Council, the Energy Savings Trust and WWF. Watch this space.★

Visit:
www.granddesignsmagazine.com

Advantages of Slimlite Double Glazed Units

- Will Comply with Building Regulations Section 6 Scotland and Document L England for improved thermal insulation.
- 5mm perimeter seal of Slimlite Double Glazed Units enables them to be glazed into 7mm deep glazing rebates.
- The smaller cavities between the glass reduces the required glazing width rebates and enables slimmer sections to be used.
- The only double glazed unit that can be glazed into most standard astragals or glazing bars.
- Can be glazed into most existing single glazing glass rebates.

Carbon Dioxide

In the 2004 Kyoto Protocol the EU pledged to reduce carbon dioxide emissions by 8% period 2008-2012, compared with the 1990 level. Estimated total residential emissions in the UK in 2005 was approximately 85 million tonnes. It is estimated that 27% of total carbon emissions are from property in the UK. Nearly all double glazing is now manufactured incorporating one pane of Low Emissivity (Low E) glass, which reflects the long wave radiation or heat back into the room.

The replacement of **one square metre** of single glazing with Slimlite Low E double glazing creates a saving of approximately **90Kg of carbon dioxide emissions per year**.

The average small house with **15 square metres** of single glazing replaced by Low E double glazing would **reduce carbon dioxide emissions by around 1350Kg per year**.

Crown Glass

Our Reproduction Crown reflects the desired slight distortion effect of the old Crown glass but also ensures the perimeter edges are flat to ensure the necessary correct construction of a double glazed unit.

Reproduction Crown provides the visual appeal preferred by Heritage and Historic Associations.

A photograph showing a person's hands holding a rectangular piece of crown glass in front of a brick wall. The glass has a slight, wavy distortion that causes the brick pattern behind it to appear slightly blurred and distorted, illustrating the 'Reproduction Crown' effect. The lighting is warm, highlighting the texture of the brick and the clarity of the glass.

The above example of Reproduction Crown illustrates the pleasing, gentle variation effect from the glass on the background brickwork.