

# Energy efficient glazing & high performance external doors

Homes lose 10-20% of their heat through windows and external doors. Installing energy efficient glazing and high thermal performance doors will reduce heat loss, to keep your home warmer and cut heating bills. Glazing can also insulate against external noise and sometimes decrease condensation.

## What to consider first

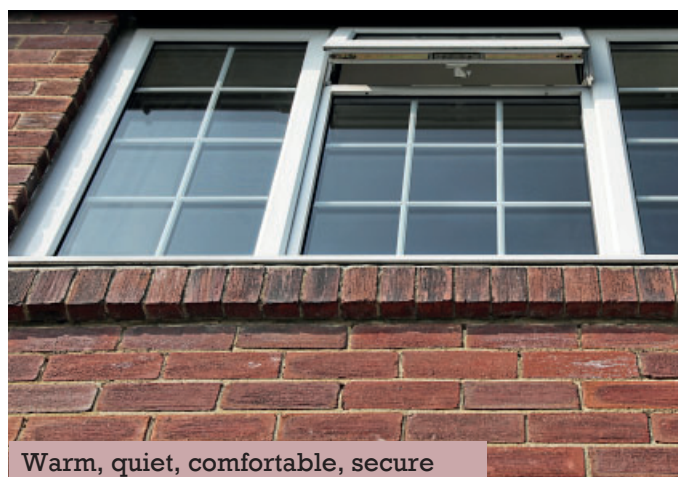
Before investing in energy efficient glazing or high thermal performance doors, check whether you can create a warmer home with more cost-effective options.

1) You first need to consider the overall insulation of your home. On average 60% of heat is lost through the walls and loft combined. It therefore makes sense to insulate these areas, if possible, before replacing the windows or doors. It can often be cheaper too.

2) Consider draught-proofing or other simple improvements, which are both cost-effective and less intrusive. These include insulated blinds for windows, and



Photo: [www.jim-lawrence.co.uk](http://www.jim-lawrence.co.uk)



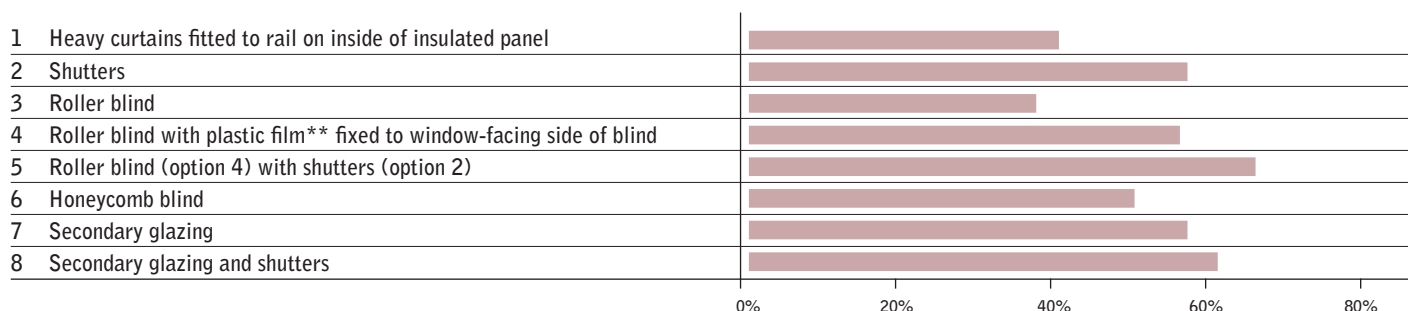
Warm, quiet, comfortable, secure

curtains for windows and doors, such as using the portiere rod shown. Shutters and secondary glazing are useful for traditional or listed buildings or if you live in a conservation area. (See our factsheet 'Secondary glazing: the low cost alternative to double glazing'.)

3) If a double-glazing window pane is misted inside it means the seal has 'failed' and the pane is no longer providing any insulation. Before replacing the whole window check with a specialist contractor if only the failed pane can be replaced.

New energy efficient windows or doors are expensive, so before splashing out it's probably worth you renovating or repairing existing windows or doors first, as well as making other cost-effective energy improvements.

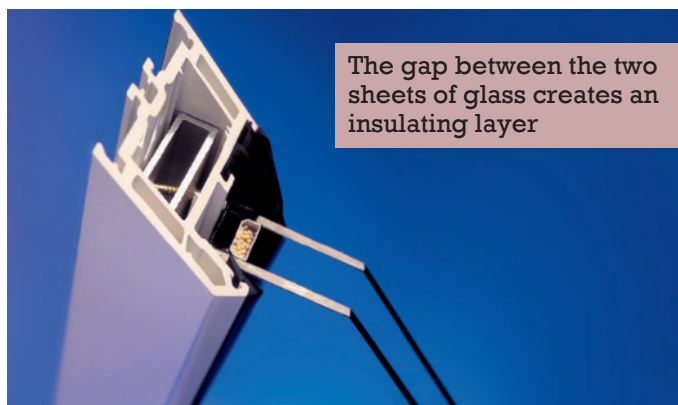
## Reduction in heat loss (%) through single glazing for various home improvement options\*



\* From English Heritage, Research into the Thermal Performance of Traditional Windows ● \*\* Low-emissivity

## Energy efficient glazing - how it works

The increased performance of energy efficient glazing has three key contributing factors: how much light and heat are let in, how much heat can escape, and if the glazing unit fits snugly with no air leaks. Low emissivity (Low-e) glass is used in energy efficient windows, which has an invisible metal oxide coating on the internal pane. This lets in light and heat, whilst minimising the heat that can escape. Double-glazed windows have two sheets of glass with a gap between them which is usually 16mm wide. The gap (which may be filled with an inactive gas like argon) creates an insulating barrier to slow down the rate at which heat escapes. Triple-glazed windows have three sheets of glass and two insulating gaps.

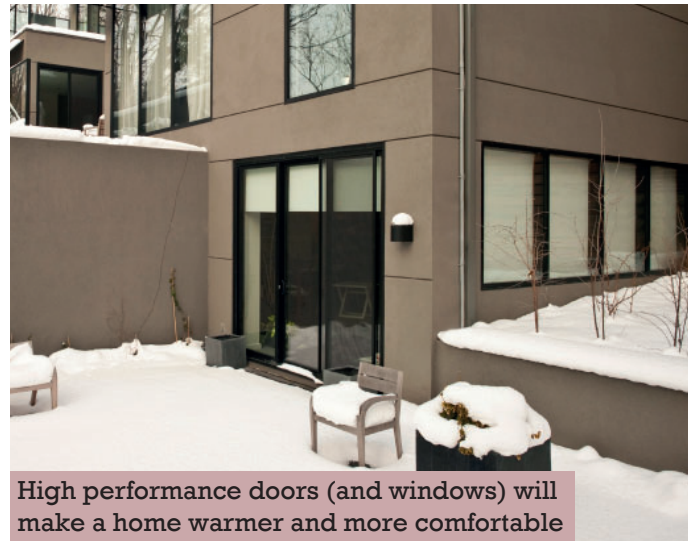


The gap between the two sheets of glass creates an insulating layer

Two other aspects that affect the energy performance of the window unit are the material of the window frame, and the material of the spacer bar between the two glass panes. This is because heat travels faster through some materials than others.

## High thermal performance doors – how they work

High performance external doors can be solid, partially glazed or fully glazed. They can be constructed of uPVC, aluminium, timber or a combination of these materials. Fully or partially glazed doors will be either double or triple glazed with a thermal barrier (sometimes called a 'thermal break') between the panes of glass. The glass panes have air or an inert gas like argon between them which prevents heat passing through. Thermal breaks also reduce the level of noise which is transferred through the door. Not only are modern doors better insulated, but they are also likely to fit much tighter in the door frame and therefore reduce draughts.



High performance doors (and windows) will make a home warmer and more comfortable

## Energy bill reductions for windows

How much you can save on heating as a result of fitting energy efficient glazing will depend on many factors including the overall energy efficiency of the property, how it's heated, if it's exposed to harsh weather, and the number and size of windows being replaced. Moving from single to double glazing will save on average: £95-£115 a year for a detached house, £65-£80 for a semi, £50-£60 for a mid-terrace house, to £30-£35 for a mid-floor flat.

There is rarely funding towards the cost of new windows or doors, so you will need to consider the financial cost against the savings you can make on your heating bills. The typical lifetime of double-glazing is around 20 years, however this can vary from 10-35 years based on quality of materials, installation and where the windows are situated. However, there may be other reasons you want to install energy efficient glazing beside cost savings – including, comfort, aesthetic reasons or as a home repair improvement.

## Minimum energy efficiency standards

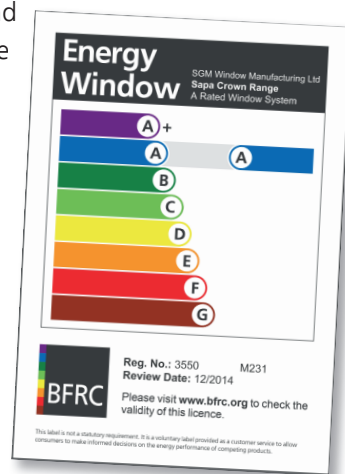
When an external window or door is replaced it needs to meet current Building Regulation standards. These standards take into account the whole window or door, which includes the frame or internal elements, because it is not just the glazing that affects heat loss. For glazing the minimum requirement is either a whole window U-value of 1.6 W or a Window Energy Rating band C. New doors require a U-value of 1.8W, or a door Energy Rating band E. The U-value is a measurement of heat transfer through a building element like a window or wall. The lower the

U-value, the slower heat can move through the element from inside to outside, making it more energy-efficient. A range of U-values for different building elements is given below for comparison .

Building element	Typical U-value (W/m <sup>2</sup> K)
Solid brick wall	2.0
Cavity wall with no insulation	1.5
Cavity wall with insulation	0.2
Single glazing	4.8 to 5.8
Secondary glazing	2.9 to 3.4
Double glazing	1.2 to 3.7
Double glazing super low E	1.3
Best triple glazing	0.6
Solid timber door	3.0
uPVC door	1.8

U-values can be confusing, and so new windows and doors also have an energy rating, similar to those on fridges and washing machines. Energy ratings enable you to compare window and door products and choose those most appropriate for your home.

With the British Fenestration Rating Council (BFRC) scheme the highest rating is A++, and the lowest rating is C for windows and E for doors. Other window energy rating labels exist (British Standards Institute, CERTASS) and work in the same way.



## Choosing energy efficient windows

There are many factors to consider when choosing replacement energy efficient windows.

- 1) Consider the Window Energy Rating you want within your budget, including the type of glass and the window frame material. Material sources and disposal for the glazing unit may also be a consideration, for example some uPVC windows have 80% recycled content for their core material.
- 2) What windows will be suitable for the style of property? Do they need to be timber-frame to fit with other windows or the neighbourhood? This is particularly

important if your home is a listed building or you live in a conservation area, but these windows will need maintenance.

- 3) What type of windows do you need? There are various types:
  - **Casement** – most common. Attach to the window frame with one or more hinge. They open to the inside or outside, or can be hinged at the top or bottom. They are normally uPVC but can be made of timber or aluminium, with various colour options.
  - **Sash** – a pane is moved up and down. Single-hung or double-hung windows are available, where one or both of the panes can move respectively. These give an authentic feel to period properties.
  - **Bay** – where an area protrudes from the house with normally three windows. Most types of glazing are available for bay windows.
  - **Tilt and turn** – casement windows which can tilt open, and may have restricted opening with catches. They can sometimes be locked partially open to allow ventilation.
  - **Roof** – for areas where vertical windows cannot be installed.

When your windows are replaced it is vital to make sure that the building remains well ventilated, as the replacement windows will be more airtight than the originals. New double glazing is required to have trickle ventilation, even if the windows you are replacing do not. Ventilation allows fresh air into your home, allows moisture to escape and helps to prevent condensation and mould.





## Choosing high thermal performance doors

Significant energy savings could be made by replacing old doors with new ones. If fitted individually, new doors could cost in excess of £1000, but when bought alongside new windows (most window companies will also fit doors) they could work out cheaper. There are other advantages to replacing doors to bear in mind, such as aesthetics, security, noise reduction and fire safety.

Whatever your reason for replacing doors, it is worth making sure the new ones are as energy efficient as possible. New external doors are generally constructed with integrated insulation to reduce heat loss and comply with building regulations.



## Properties that are listed or in a conservation area

If your property is listed or in a conservation area there are likely to be restrictions on what you can do to your windows and external doors, so contact your local authority conservation or planning office to discuss the options available before carrying out any work. If you can't replace the windows, there are several non-intrusive alternatives which can improve the energy efficiency and warmth of your home (see the bar chart above). These include heavy lined curtains, insulated blinds, internal or external shutters and secondary glazing – or a combination of these.

For technical and practical advice for renovating traditional buildings see [www.cse.org.uk/older-homes](http://www.cse.org.uk/older-homes)

## Choosing an installer

The **Glass and Glazing Federation** is a membership organisation. Members sign up to a consumer code of practice. You can search for member installers for windows and doors on [www.myglazing.com](http://www.myglazing.com), as well as advice on buying glazing products. It has a free conciliation scheme in the event of a dispute.

### Fenestration Self-Assessment Scheme (FENSA)

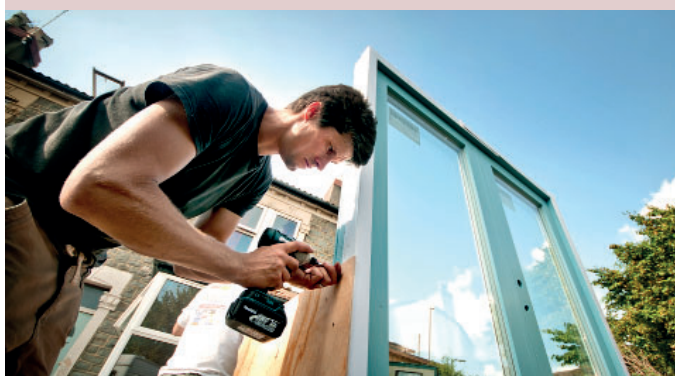
is a government-backed Competent Person Scheme for the replacement of windows, doors and roof lights in England and Wales against relevant building regulations. Members registered with FENSA comply to thermal performance standards so that any glazing they install meets standards for energy efficiency. [www.fensa.co.uk](http://www.fensa.co.uk) | 0207 645 3700

### The British Fenestration Rating Council (BFRC)

website has a 'find-a-product' search facility so you can find a door or window by energy rating for your postcode area, and find authorised installers and manufacturers. [www.bfrc.org.uk](http://www.bfrc.org.uk) | 020 7403 9200

### The Double Glazing & Conservatory Ombudsman Scheme (DGCOS)

offers a free service to investigate complaints about work carried out by its members. This includes free independent inspections, arbitration and a compensation fund. Accredited installers must offer deposit protection and a comprehensive guarantee to customers. [www.dgc.org.uk](http://www.dgc.org.uk) | 0845 053 8975



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Charity: 298740  
Founded: 1979

The Centre for Sustainable Energy is a national charity that helps people change the way they think and act on energy.

Our Home Energy Team offers free advice on domestic energy use to people in Bristol, Somerset, Wiltshire, South Gloucestershire and Dorset.



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