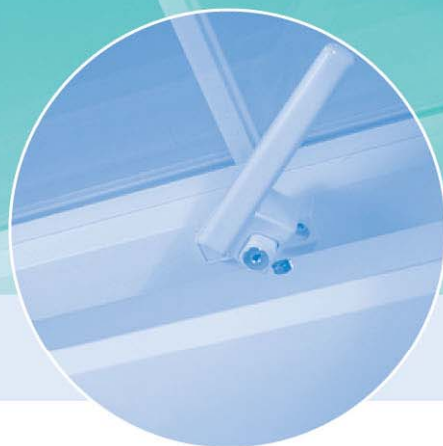


Energy Efficient Glazing



Key Points

- Establish opportunity to replace windows – tenure, funds, and current glazing type (single glazing or old double glazing).
- Are they in a conservation area or come under an article 4 directive? If yes, double glazed specialist window types or secondary glazing are options.
- There are CO₂ and fuel bill savings for high efficiency windows over standard double glazing – opportunity to install high efficiency glazing may not reoccur for many years.
- Where windows cannot be immediately replaced, draught proofing should be recommended.

Further Information

BFRC provide the rating system for windows
Tel: 020 7403 9200 www.bfrc.org

FENSA (Fenestration Self-Assessment Scheme) (England and Wales only).
Tel: 0844 84 888 28 www.fensa.co.uk

GGF represent the glass and glazing trade in the UK
Tel: 0870 042 4255 www.ggf.co.uk

Savings Potential

If everyone in the UK who could installed Energy Saving Recommended (ESR) double glazing we could save £850 million from our fuel bills and enough energy to heat over 1 million homes per year.

- The annual CO₂ and financial savings for replacing all single glazed windows in a typical property are given below:
- If replacing **old double glazing** with **A-rated high efficiency** double glazing, additional savings will be achieved.

A typical gas-heated semi would save an additional £430 and 3 tonnes of CO₂ over the **lifetime** of the windows by installing A rated windows, compared to a current building regulation (E-rated) replacement window.

		Single to ESR double glazing (C rated) Annual savings			Single to A rated double glazing. Annual savings		
		2 bed Flat	Mid terraced	Semi-detached	2 bed Flat	Mid terraced	Semi-detached
Gas	£ / yr	£40	£105	£140	£45	£115	£155
	kgCO ₂ /yr	200	540	720	220	580	780
Electric	£ / yr	£65	£190	£260	£75	£200	£285
	kgCO ₂ /yr	450	1,300	1,800	490	1,400	1,900
Oil	£ / yr	£55	£150	£205	£60	£160	£220
	kgCO ₂ /yr	240	640	870	250	680	930
LPG	£ / yr	£60	£155	£210	£65	£150	£210
	kgCO ₂ /yr	220	590	780	250	570	800
Solid	£ / yr	£45	£115	£160	£45	£125	£175
	kgCO ₂ /yr	480	1,300	1,800	520	1,400	1,900

Behaviours

Carbon and financial benefits for these actions are small:

- **Curtains:** Heavy curtains can reduce heat loss through a window if drawn at dusk. Keeping curtains open where sun shines through will maximise solar gains.
- **Vents:** Using trickle vents in winter instead of opening windows will minimise heat escape whilst maintaining adequate ventilation. Nb It is not possible to retrofit trickle vents.

Frequently Asked Questions

Why does condensation appear between the panes of my double glazed windows during the winter?

Condensation on double glazed windows is caused by moisture between the glass layers. When it is cold, the moisture condenses on the outer glass pane, very much like water beading up on the outside of a cold glass of water. This is a sign that the seal between the two sheets of glass is beginning to fail.

Will double glazing eliminate condensation on windows?

Double glazing will certainly reduce the amount of condensation and in some cases eliminate it, although this cannot be guaranteed. Additionally, double glazing may cause condensation to form in other parts of the house where the ventilation is restricted. If this presents an issue, then further ventilation should be considered.

Those with low-e glass may find that external condensation occurs. This does not indicate a problem with the windows, and occurs mainly on north-facing windows.

Why do I need trickle vents in my new double glazing?

All houses need a certain amount of ventilation to prevent the build up of condensation, as well as removing unpleasant household odours. Badly fitting doors and windows do this in an uncontrolled way. Trickle vents allow you to control the amount of ventilation and reduce the potential loss of warm air. In some cases trickle vents may also be required to comply with building regulations.

Can I install double glazing on a 'Do-It-Yourself' basis?

We recommend that you use a FENSA registered installer. It is possible to install double glazing yourself, but the units must comply with stringent building regulations and European directives, and you will have to arrange building regulations approval yourself with the local council.

What are the benefits of double glazing?

The main benefit of double glazing is that heat lost through the windows will be at least halved. The risk of condensation building up will be reduced, there will be fewer draughts and your rooms will be more comfortable. Additionally, double glazing can reduce the noise level from outside and certain frame types will reduce the amount of maintenance required by the householder.

Can you install double glazed doors and windows on listed buildings?

Such properties are exempt from current building regulations and it is important to check with the Building Controls Department at your local authority before starting the project. If necessary, manufacturers can supply doors and windows to match the existing style and appearance of the property.

Are there any differences in the energy performance of timber, uPVC and metal windows?

The thermal properties of windows are dependent on the overall build quality and the materials used. Timber, metal and uPVC windows can all perform well. The best indicator of their performance is the BFRC rating.

Is triple glazing more energy efficient than double glazing?

Triple glazed windows are more common in Europe, although these are of a different style to those found in the UK. A triple glazed window does not necessarily have a better U-value (or BFRC energy rating) than a double glazed window, as all the different energy saving elements of a window contribute to the energy rating. Also, these units can be heavier, with smaller openings.

Customer Key Questions

Some key questions to ask when choosing and installing new windows:

- What is the energy rating?
- What are maintenance requirements for frames?
- Is the installer a member of an industry trade association e.g. Glass and Glazing Federation, British Woodworking Federation, British Plastics Federation, Council for Aluminium in Buildings or Steel Window Association?
- Does the window comply with current building regulations?
- Does the customer need to get building control permission from council?
- Is the property in a conservation area?

Background

- FENSA estimate that there are approximately **2 million window replacements per year** across the UK.
- Across the UK, it is estimated that **17%** households have no double-glazing.
- Windows were **typically single glazed in the past**. When energy efficiency requirements came into force through building regulations, double glazing was introduced. Double glazed units came to market in the late 1970s, and legislation for replacement units was introduced in 2002 (see Compliance).
- **Heat is lost** through single glazing around **twice as fast** as through standard double glazing. Heat loss is slowed down by having two sheets of glass and an air gap between them.
- The **heat loss elements** of a window unit incorporate the glass itself, the gas filling and distance between the panes, the glass pane spacers and the frame type. These all affect heat loss through the window and contribute to the BFRC rating.

Different Technologies

Energy Saving Recommended criteria applies to windows with a BFRC rating of C or above. Windows are given an energy rating under the BFRC (British Fenestration Rating Council). This measures different heat loss elements of a window – e.g. frame and glass – as a whole, including:

- Thermal Transmittance – how quickly heat is transferred out of the window.
- Solar Factor – how well solar heat is kept out.
- Air Leakage – how well sealed the unit is.

Further information on energy ratings can be found www.bfrc.org.uk

What affects a window's energy efficiency?

● Glass

Usually found in 2 layers with a gap of around 16mm. Triple is available and will generally have a higher efficiency (however, you do not necessarily have to use triple glazing to maximise the energy efficiency of a window).

Low emissivity (Low e) glass – has an unnoticeable coating (a thin layer of metal oxide) on the outer side of the internal pane. Whilst this does reduce 'solar gain', it also minimises heat loss from the home.

● Gas filling

The gas filling between the panes of glass is usually air, although more efficient and thus higher rated windows will be filled with argon and sometimes xenon or krypton. The gas slows down the transfer of heat through the gap.

● Pane spacers

These separate the panes of glass around the inside edge, often made from aluminium – a good conductor of heat. Better insulating spacer bars contain little or no metal and are also known as 'warm edge'.

● Frame materials

Wooden frames have a low environmental impact, but will require maintenance. Recommended in conservation areas.

Aluminium or Steel frames have a long life and slim frames. They can be recycled.

uPVC is the most common frame type, and has a long life. They can be recycled.

Composite frames have an inner timber frame with an aluminium or plastic protective layer on all external surfaces.

Further glazing technologies

Special window types

These are available as double glazed units and can be used, for example, in period properties.

- Casement.
- Tilt and Turn.
- Vertical Sliding Sash.

Trickle vents

These are found at the top of a window, and allow controlled ventilation. They can help reduce/prevent condensation.

Secondary glazing

This is not as effective as double glazing, due to a lack of air tightness. It will reduce heat loss, but should generally not be considered unless double glazing units cannot be fitted. Some typical savings are shown below:

		Secondary Glazing		
		2 bed Flat	Mid terraced	Semi-detached / Detached
Gas	£ / yr	£45	£70	£100
	kgCO ₂ /yr	240	385	545
Electric	£ / yr	£65	£105	£150
	kgCO ₂ /yr	595	950	1,340
Oil	£ / yr	£65	£105	£150
	kgCO ₂ /yr	285	460	655
LPG	£ / yr	£65	£105	£150
	kgCO ₂ /yr	260	420	595
Solid	£ / yr	£50	£80	£115
	kgCO ₂ /yr	590	950	1375

Glazed doors

For patio doors which are mainly glazed, ensuring a quality fitting reduces chances of them dropping and opening large gaps where draughts can enter and heat can escape.

There is no energy rating for doors currently, instead the U value is used. For best practice, recommend a U value of 1 for a solid door or 1.5 for a half glazed door.

Compliance

Replacement windows must comply with the minimum standard of building regulations of energy rating E (in Scotland D rating; in Ireland E rating). New windows – e.g. in extensions - must be at least energy rating D.

It is recommended that new or replacement windows are installed by a FENSA registered installer or one of the other two Competent Person window registration schemes (British Standards Institution BSI or CERTASS Limited). However, if this is to be installed by the homeowner building control must be notified before installation begins.

If you live in a listed building or conservation area there may be different and stricter regulations, always check with your local planning office.

For more information the householder should contact their local council building control officer.

Finding the Product

Registered installers and can be found here:

http://www.fensa.co.uk/asp/member_search.asp

A list of windows by their energy rating and frame material can be found here:

<http://www.bfrc.org/defaultDirectories.aspx>

Industry Developments

Solar Integrated – This is an emerging technology. PV panels are laminated between two layers of glass. It can be used as shading or as conventional glazing.

Energy Ratings for Doors – these are similar to the window scheme and have been launched in Spring 2008. Further information can be found at www.bfrc.org.uk

Note: See draught proofing fact sheet for advice on stopping draughts through letter boxes and locks, around doors and non-uPVC windows.