

## Glazing

When a new domestic property is being built, it is good practice to consider 'passive solar design' (see information sheet 13). An integral part of passive solar design, is glazing. Ideally, the south-facing side of the property should have a relatively large area of glazing to take advantage of 'solar gain' and the north-facing side relatively little glazing in order to minimize thermal loss. As glazing is much less thermally efficient than a well-insulated wall, it follows that from an energy efficiency point of view, the area of windows should be kept to a minimum, especially on the north-facing walls and walls which are shaded by trees, buildings etc. To keep heat loss from glazing to a minimum, windows should be at least double or triple-glazed and the glass itself of a type which permits solar radiation to enter, but reduces thermal transmission outwards.

The glazing industry has offered several innovations that attempt to improve thermal insulation. The application of multiple panes of glass or special coatings to the glazing unit can significantly reduce heat transfer by radiation, conduction, or convection. Special construction techniques or materials can also reduce heat transfer through the window frame itself.

A typical insulated glazing unit (IGU) has a construction consisting of two or more panes of glass spaced apart and hermetically sealed to form a double glazed unit having an air space between each pane of glass.

Because glass is a poor insulating material it is the air space which helps stop conducted heat and therefore provides the insulation. The width of the gap is important. Early double glazing had a 6mm gap which is not really sufficient. A gap of 12-20mm is more effective and common in most modern double glazing. A larger gap is counterproductive as it will allow heat transfer by convection.

The space between the panes may be filled with air or an inert gas like argon or less commonly, krypton, which provide better insulating performance. (Argon has a thermal conductivity 67% that of air.) Typically the spacer is filled with a desiccant to prevent condensation and

improve insulating performance. Less commonly, most of the air is removed, leaving a partial vacuum, which drastically reduces heat transfer through convection and conduction. This is called evacuated glazing.

### **Low-emissivity coating**

Low-emissivity (Low-E) glass has a thin coating, often of metal, on the glass within its airspace that reflects thermal radiation or inhibits its emission, reducing heat transfer through the glass. A basic low-e coating allows solar radiation to pass through into a room. Thus, the coating helps to reduce heat loss but allows the room to be warmed by any sunshine. The low-e coating is usually on the inside pane of glass; if solar control is required then the outside pane of glass would have either a film or a body tint to reflect or absorb solar radiation. The principle of operation is similar to the greenhouse effect in which short wavelength radiation is transmitted through the pane, but longer wavelength radiation is absorbed. However, low-e glass reflects the radiation rather than absorbing it, so improving performance.

### **Low E Glass and Document L of Building Regulations**

Most people are aware that effective from 1st April 2002 - all replacement window installations in England & Wales

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are subject to Building Regulations. This new regulation in particular affects the minimum levels of insulation that replacement windows must have when fitted in your home. Levels of insulation are measured as U values. To get the required level of insulation some sort of LOW E glass (typically Pilkington K in the UK - although there are other brands) will have to be used. It may also be necessary for the sealed double glazed units to be gas filled (probably Argon).

## U-values

A U-value is a measure of the heat transference through a material. It is measured in Watts per square metre per degree Kelvin ( $W/m^2K$ ). The lower the U value, the better the insulation level.

According to the Building Regulations 2002 the minimum acceptable u-values are:

<b>Element</b>	<b>U-value</b>
Walls	0.35
Pitched roof with loft insulation	0.2
Glazing in metal frames	2.2
Glazing in timber or PVC frames	2.0
Glazing in an extension	1.8

## Extensions

The Building Regulations 2006 have improved the standards required for extensions (see u-value above).

## Compliance

There are two ways that you can ensure compliance with relevant regulations. Firstly you may employ a contractor or installer who is registered under the FENSA self-certification scheme. This contractor will be approved to carry out the work in accordance with relevant regulations without inspection by the council and will inform FENSA when

installation has been completed. Random inspections of completed work are carried out.

FENSA stands for the Fenestration Self-Assessment Scheme. It has been set up by the Glass and Glazing Federation (GGF) <http://www.ggf.co.uk/> and other industry bodies with Government encouragement in response to the current Building Regulations for England and Wales.

## Exceptions to new Document L

- Conservatories are not included provided they are separated from the rest of the building (for example by doors). When replacing a broken sealed unit, it can be replaced "like for like". The regulations apply to the entire window replacement.

## Tips when replacing windows:

- Replacing windows on your property can change the visual appearance of your home. Choose a style that matches your property.
- Planning permission may be required in order to fit replacement windows. This is particularly the case in "listed buildings" and in "conservation areas".
- With PVCu windows, ask your supplier if the windows are fully welded or if parts of the window (transoms/midrails) are mechanically fixed. Mechanically fixed ones are generally "cheaper" to manufacture. It's possible with wear and tear (especially on doors) that the mechanical (screw) fixing will split apart - weakening the frames and reducing performance.
- With timber frames you will need to paint every 3-5 years.

## Some installers in Cornwall:

Name	Address	Postcode	Telephone	Web/e-mail
Camel Glass & Joinery Ltd	Units B5, B6 & B7 Cardrew Business Park Redruth	TR15 1SQ	01209 213465	
Penryn Glass Centre	Commercial Road Penryn	TR10 8AQ	01326 375 124	<a href="http://www.penrynglass.co.uk">http://www.penrynglass.co.uk</a>
Truro Glass Co	Glasteinan House Tabernacle Street Truro	TR1 2EJ	01872 276 697	<a href="http://www.truroglass.co.uk">http://www.truroglass.co.uk</a>
CAW (Cornwall) Ltd	Threemilestone Industrial Estate Truro	TR4 9LD	01872 271491	<a href="http://www.cornwalldoubleglazing.co.uk">http://www.cornwalldoubleglazing.co.uk</a> <a href="mailto:cawcornwall@lineone.net">cawcornwall@lineone.net</a>
Newquay Glass Centre	12 Pargolla Road Newquay	TR7 1RW	01637 873 233	<a href="http://www.newquayglass.co.uk">http://www.newquayglass.co.uk</a>
Supreme Windows	Volterra Cockwells Penzance	TR20 8DB	01736 741 174	<a href="mailto:sieffrey26@btinternet.com">sieffrey26@btinternet.com</a>
Collington & Company	16 Water-Ma-Trout Industrial Estate Helston	TR13 0LW	01326 572599	<a href="mailto:tracy@collingtons.com">tracy@collingtons.com</a> <a href="mailto:colin@collingtons.com">colin@collingtons.com</a> <a href="mailto:mark@collingtons.com">mark@collingtons.com</a>
Cornwall Glass & Glazing	Blackwood House, Stennack Road Holmbush Industrial Estate, St Austell	PL25 3JQ	01726 66325	<a href="mailto:info@cornwallglass.co.uk">info@cornwallglass.co.uk</a> <a href="http://www.cornwallglass.co.uk">www.cornwallglass.co.uk</a>
Everest Ltd	Unit 2/4 Moorswater Industrial Estate Liskeard	PL14 4LP	01579 347193	
C & R Plastics	e4/Unit Formal Industrial Estate Camborne	TR14 0PY	01209 711878	
Bude Windows & Conservatories	Unit 14a Kings Hill Industrial Estate Bude	EX23 8QN	0808 1000602	
Duchy Plastics Ltd	116-118 Launceston Road Callington	PL17 8DS	01579 383201	

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