



GLAZING OVER

Information Service, Centre for Alternative Technology, Machynlleth, Powys, SY20 9AZ.
Tel: 0845 3308373 or 01654 705989 e-mail: info@cat.org.uk
For more information sheets, see our web site: www.cat.org.uk/information

Single-glazed windows can be responsible for one-fifth of the heat lost from a home. Double-glazing should cut this loss in half. As replacement double-glazing is fairly expensive, if you're on a budget look first at insulating your home as much as possible (see our *Energy Efficiency in the Home* sheet), draught-proofing existing windows, and looking at secondary glazing options.

Secondary glazing

You can improve the performance of old windows without going to the expense of double-glazing. A simple, cheap alternative is to fit secondary glazing, which can be an additional window fitted on the inside of the existing frame, or a magnetic or adhesive pane to fit to the frame, or even just clear plastic film stuck to the interior frame.

Clear plastic film (polythene) should be available from DIY stores. Attach it round the edge with double-sided sticky tape and then heat it to make it first stretch and then contract back as it cools - to clear the wrinkles. It won't last a huge length of time - probably one winter - but is very cheap.

Rigid (or slightly flexible) plastic sheets are usually available from DIY outlets. These can be stuck on, or held magnetically (to enable easier cleaning). More advanced options could be a single pane in an aluminium frame attached on hinges or sliding runners, or perhaps an old window cleaned up and fitted inside the frame.

There are also specialist window films that improve the insulating properties of glass by letting through certain wavelengths of light in only one direction.

The most advanced type of secondary glazing is to fit a new second window inside the existing one. This will often be better and cheaper than replacing windows altogether. You could hire a local joiner to make them, or proprietary systems are available - for example from DIY stores.

Specifying new windows

When buying new or replacement windows, we recommend double-glazed, low-e coated, argon filled, timber framed units. The gap between the two panes of glass should be about 20mm - a smaller gap gives a slightly poorer performance, but a bigger gap won't make much difference (except that it will give better sound insulation). Windows with lots of glazing bars (e.g. Georgian) are poorer: the multiple bars conduct heat out.

Low-E ("low emissivity") coating is required by current building regulations. A very thin layer of metal on the outer surface of the inner pane reduces heat transfer across the gap in a double-glazed window.

Argon gas in the gap between the panes improves the performance of the window, as argon does not conduct heat as well as air. Krypton gas is better but more costly - it's particularly useful if a narrow gap is needed.

'U-values' measure thermal performance. A lower U-value gives less heat loss.

Specification	U-value
Single glazing	5.5
Standard double glazing	2.7
Double glazing, low-E coating	1.8
Double glazing, low-E coating and argon-filled	1.6 to 1.3
Triple glazing, multiple low-E coating and argon-filled	less than 1.0

Timber, uPVC or aluminium frames?

For replacement windows, the authors of CAT's 'Whole House Book' recommend good quality timber frames, as these require little energy to manufacture, can last for over 50 years, and can then be renovated rather than replaced. In contrast, uPVC window frames require more energy to manufacture and lead to higher pollution problems at manufacture and disposal. Aluminium manufacture involves a lot of energy use and pollution, and some frame coatings make recycling difficult - not ideal for such a

high-value material. If you have to use aluminium, look for anodized frames.

Choosing wood framed windows

Wood frames have had a poor image in the past, as UK-made softwood windows were often of low quality. However, we are learning from the Scandinavians and it is possible to get UK-made windows with high standards of airtightness, built from homegrown, durable, untreated wood.

FSC-certified temperate (not tropical) hardwood or durable softwood would be first choice. A durable temperate hardwood (e.g. oak, sweet chestnut or larch) won't need treating and should last 30 years. The preservatives used to protect softwood will cause some pollution when it eventually needs to be disposed of. If you choose a less durable wood, look for one pre-treated with a low-impact natural, renewable treatment. Any sustainable (FSC) timber is preferable to uPVC, but avoid painting wood as this increases the environmental impact.

Costs

The WWF report 'Window of Opportunity' collated various estimates of the relative costs of timber and PVC windows. It found that high performance timber windows should not cost more than PVC, and that sustainable timber (e.g. FSC-certified) should cost no more than standard timber. www.wwf.org.uk/filelibrary/pdf/windows_0305.pdf links to this free download (1.8MB)

Meeting building regulations

Replacing either glass units (e.g. broken windows or faulty double-glazed units) or some rotten wood in the frame or sash will not need Building Control approval. When replacing an entire window frame and the opening parts of a window, or a door that is more than 50% glazed, you will need approval - but by employing a FENSA registered (Fenestration Self Assessment Scheme) joiner or installer you don't need to get the work checked. Instead, the installer issues a certificate to verify compliance with Part L of the Building Regulations.

Conservation-grade windows

For properties such as listed buildings the requirements can be strict, but high-specification windows (or secondary glazing)

are available. Specialist replacement units (e.g for sash windows) replicate the appearance of old windows but have much greater levels of insulation & draught-proofing. To get help finding suppliers of conservation glazing, ask English Heritage, Historic Scotland, or Cadw (for Wales).

Further Information

For much more advice on eco-building and renovating, including in-depth guidelines on materials choice and techniques, see **The Whole House Book**. For a general guide to reducing energy use in the home, see the CAT book **The Energy Saving House**. These, and many more eco-building books, are available from **CAT Mail Order**:
Tel: 01654 705959; <http://store.cat.org.uk>

CAT runs many **residential courses** on energy efficiency & eco-design.
01654 705981 or www.cat.org.uk/courses

CAT Consultancy offers detailed one-to-one technical advice. Many people planning a big project find it useful to come here and run through their plans with CAT experts.
www.cat.org.uk/consultancy

You can also contact **CAT's Information Service** with questions about eco-building.
Tel: 01654 705989; email: info@cat.org.uk

Contacts

Find environmentally aware contractors through the **Association for Environment Conscious Building (AECB)**.
Tel: 0845 456 9773; Web: www.aecb.net

Forest Stewardship Council (FSC)
Tel: 01686 413916; Web: www.fsc-uk.org
Web site includes a database of products made from sustainably-sourced timber

FENSA maintain a list of qualified installers.
Tel: 020 7645 3700; www.fensa.org.uk

For advice on conservation glazing:
English Heritage, *Tel: 0870 333 1181*
Web: www.english-heritage.org.uk
Historic Scotland, *Tel: 0131 668 8600*
Web: www.historic-scotland.gov.uk
Cadw (for Wales), *Tel: 01443 33 6000*
Web: www.cadw.wales.gov.uk

Further reading on the **National Green Specification** site: www.greenspec.co.uk/html/materials/windowframes.html