Draughtproofing and secondary glazing

ENGLISH HERITAGE

Insulating the home

Effective home insulation is now a major priority for most householders, both for comfort and economy and to limit the waste of natural resources. Yet while new homes are built to high levels of energy efficiency under modern Building Regulations, many people live in homes that predate these requirements, when heating and insulation were considerably less sophisticated.

Thermal insulation is undoubtedly a key problem for home owners. However, only about 20% of a home's space heating is lost through windows, and most of that escapes through the air gaps around the window frames, not through the single glass panes themselves. The other 80% is lost through unlagged roofs and uninsulated floors and walls. Houses with ventilated and suspended timber floors and open chimneys, for example, lose much more heat and admit far stronger draughts than those with even the poorest-fitting windows and doors. Investment in solutions to these problems (such as roof insulation) is repaid more quickly than most other forms of energy saving. Installing double-glazed windows, therefore, does not fully address the problem of heat loss.

Double glazing

Installating double-glazed windows has been one of the most fashionable home improvements over the past 15 years. Banks, building societies, and window installers' loan companies offer a variety of enticing financial deals, and aggressive marketing has helped to persuade many people to abandon traditional windows and doors for inappropriate substitutes.

The installation of double glazing in old dwellings is rarely economical unless the existing window frames are so badly damaged or rotten that replacement is essential. (Installation of double glazing requires the removal of the entire window frame, and possibly the demolition of the window arch as well.) Although double glazing can certainly reduce heat loss, the reduction is often not significant. The Buildings Research Establishment recommends that the two sheets of glazing should be at least 20mm apart to be thermally efficient: such a distance is rarely achievable within the context of old glazing bars with short rebates. At the same time, it may take many years for energy savings to cover the cost of installing double glazing. Recent (1993) studies by English Heritage suggest a payback period of at least 60 years, yet houses change hands in the United Kingdom about every seven to ten years. Moreover, the resale value of a property does not often reflect the investment made in replacement windows, especially where the designs are ugly or unsuitable.

Upgraded sash windows fitted with draughtproofing in a South London terrace

FRAMING OPINIONS
LEAFLET 1

Many house owners may have been convinced that their old timber windows are rotten, draughty, and beyond renovation. In most cases involving pre-1939 homes there is in fact little evidence of wholesale deterioration. Some horizontal sash members may need painting, and perhaps, on the windward side of the property, the rails and sills will be bleached, friable and partially rotten. Minor repairs will often ensure that such windows are healthy and serviceable.

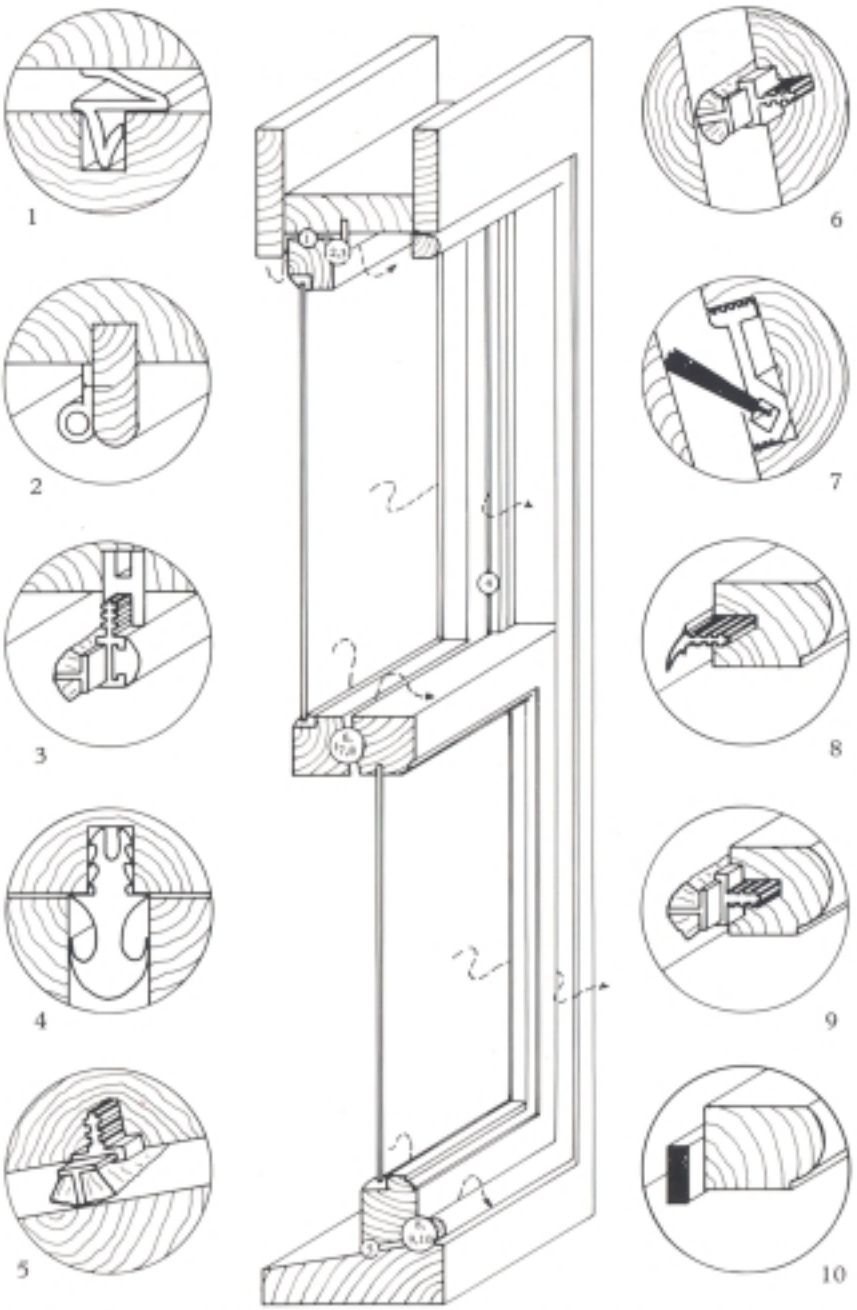
Draughtproofing

One of the best and least intrusive ways of achieving improved performance from windows in old buildings is by installing draughtproofing. This will considerably reduce heating bills and energy use, especially if combined with other modest measures. It will also help to reduce noise and dust ingress. Most importantly, draughtproofing does not damage the visual aesthetics of an old building.

Several forms of draughtproofing are available, each of which operates differently. Some types simply act as a gap filler, and are applied as a mastic or foam in the same way as bathroom sealant. Other forms keep the weather out by a snug, slightly oversized fitting, comprising silicone rubber tubes, polypropylene and nylon-finned pile brushes, or rubber, polyester, or sprung-metal Z and V fins.

A good draughtstrip should not only insulate, but should also be durable and of an acceptable appearance. Cheap DIY products have a lifetime of perhaps 10 years, but better-quality products will last for at least 20 years.

If draughtproofing is installed, window and door maintenance needs little refinement. The effectiveness of some products is limited by overpainting; repeated coating of brush-type draught strips, for example, will make them inflexible. Note, too, that alkyd paints will not stick easily to rubber draughtproofing, and that some solvent paint removers attack plastic.



***1** Plastic or sprung metal 'V' or 'Z' strip **2** Glued or pinned silicone rubber tubing **3** Parting bead (Ventrolla) **4** Parting bead weatherstrip (Mighton) **5** Bottom sash/sill brush (Ventrolla) **6** Meeting rail brush (Ventrolla) **7** Brush for meeting rails (Draftseal) **8** Standard weatherstrip (Mighton) **9** Staff bead or button rod (Ventrolla) **10** Silicone seal (Draftseal)*

Reversible upgrading: inserting a brush weatherstrip into the meeting rail of a sash frame

In homes of the past 300 years, vertically sliding sash windows have remained the most common type of opening, and their sophisticated working mechanisms often appear difficult to draughtproof. However, a number of companies offer a nationwide repair and upgrading service for these windows, using a variety of weatherstripping ideas. One system replaces the existing staff and parting beads with modern equivalents that incorporate brush seals of woven polypropylene pile. Others rout out slots in the sides of the frames and the meeting rails to receive push-fit, flexible Z or V strips or variously shaped brushes, which are usually concealed when the window is closed.

A different system is used for steel and timber casements. The window is first overhauled, to ensure that hinges and catches operate easily and that the casement is hung well. Then the opening edge of the casement is temporarily coated with a non-stick lacquer or releasing-agent gel, and silicone

MARTIN J CLAYTON

Windows: comparison of total costs over 50 years

	Softwood £	Hardwood £	Aluminium £	PVCu £
Installation(100m²)	16000	21000	19000	18000
Occupancy costs	37750	43750	38550	27750
Total cost in use (excluding replacement)	53750	64750	57550	45750
Life expectancy	35 years	40 years	50 years	40 years
Replacement cost per year of life expectancy over 50-year period	22850	26250	19000	22500
Total of cost-in-use and replacement cost	76600	91000	78550	68500

• Building: Doors and Windows Supplement 30 April 1993

Repair versus replacement

Windows : comparison of total costs: over 30 years, 30 window units

	Existing softwood sash windows 1760 x 1060				Replacement PVCu sash windows 1760 x 1060	
	1	2	3	4	5	6
	£	£	£	£	£	£
Initial repairs/ Installation costs	0	2000	3500	8190	13080	26000
Occupancy costs	12700	12700	12700	12700	9340	9340
Cost-in-use totals:	12700	14700	16200	20900	22420	35340

Existing softwood sash windows (1760 x 1060mm) *1 Occupancy/cyclical maintenance costs only, assuming sound condition 2 Draughtproofing plus occupancy/cyclical maintenance costs, assuming sound condition 3 Overhauling, minor repairs, and draughtproofing, plus occupancy/cyclical maintenance costs 4 Overhauling, major repairs, and draughtproofing plus occupancy/cyclical maintenance costs.*

Replacement PVC-U sash windows (1760 x 1060mm) *5 Assessed likely replacement costs based on industry data, plus occupancy/cyclical maintenance costs 6 Reconciled data derived from a particular case study (indicating that the assessed costs in column 5 may reflect the position at the lower end of the market and that installation costs could be much higher).*

Comparative costs of domestic energy saving measures

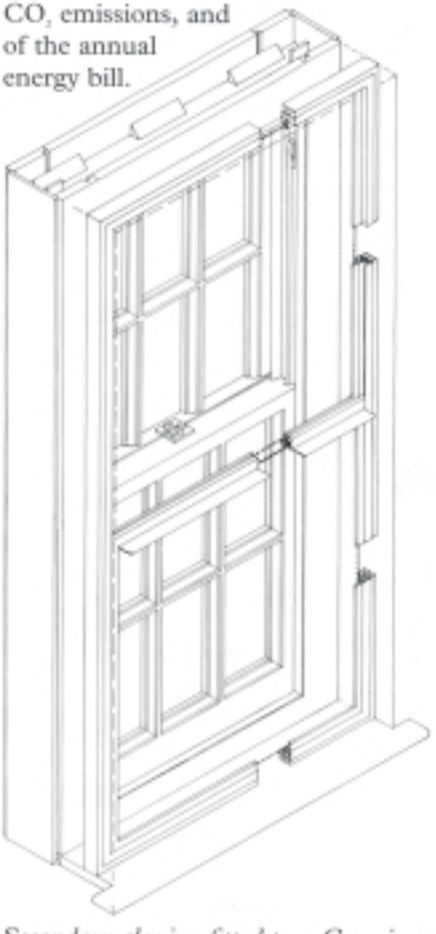
Action	DIY/ contractor	Approx inst. cost (£)	Average annual savings (£)	Approx cost recovery (yrs)
Loft installation	DIY	120-150	70	1 - 3
	cont	220-250	70	3 - 4
HWinst. control measures: – thermostatic valves – programmer – cylinder thermostat – cylinder jacket	cont	250-350	50	5 - 7
Cavity wall installation	cont	350-450	70	5 - 7
Solid wall installation	DIY	150-300	70	2 - 5
	cont	1500-3000	70	20 - 40
Draughtproofing	DIY	50	30	1 - 2
	cont	150-750	30	5 - 25
Secondary double glazing	DIY	150-300	30	5 - 10
	cont	1000-1500	30	30 - 50
Double glazing	cont	2500-6000	40	60 - 100+

foam rubber sealant is injected into the gap between the closed window and the frame. The sealant quickly solidifies, filling the air gap and sticking to the non-treated frame sides, but not to the lacquered casement edge.

Professionals can both overhaul and weatherstrip windows at the same time, giving good value for money. The financial investment is quickly compensated for in terms of energy savings, thermal comfort, and noise and dust exclusion. However, for those who like the challenge of doing their own home improvements, a few companies supply gaskets, seals, and pile brushes directly to the public.

Energy auditing

The government is currently endorsing commercial home energy surveys that give owners an energy efficiency rating for their homes. An energy surveyor or auditor will visit your property to assess its energy losses and gains according to set formulae. The average fee is under £100. Your home is then ranked on a scale of 0 to 10, and an estimate is provided of the likely level of CO_2 emissions, and of the annual energy bill.



Secondary glazing fitted to a Georgian sash window

Modern wood replacements for traditional sash windows can be just as inappropriate as plastic or aluminium substitutes

Advice is then offered on the most cost-effective ways to improve your home.

For a free information pack detailing this energy auditing service call 0345 247347.

Secondary glazing

In many cases secondary glazing is a cheap, feasible, and far more sympathetic alternative to the installation of sealed double-glazed units. It too solves the problems of heat escaping and draughts entering through the gaps around the sides of windows.

In a recent Department of the Environment study of energy audits, in six out of the nine houses considered draughtproofing was recommended as the most cost-effective action. Double glazing, on the other hand, was recommended in only four out of twelve schemes proposed, and then only as secondary glazing, not as full-frame replacements. Secondary glazing costs approximately £440 per home, whereas sealed double-glazed units cost from £3000 to £6000. Secondary glazing is a job that most glaziers can do. It can be removed when not wanted, enabling the original window to operate as normal. Divisions in the glazed panels can be hidden behind the meeting rails or glazing bars, making them reasonably unobtrusive. Some windows, however, are not suitable for secondary glazing, owing to the narrowness of the internal sill or the difficulty of accommodating the new panes within an oddly-shaped or unduly protruding architrave. In these cases draughtproofing is the best solution.

For more information on draughtproofing (including a list of UK draughtproofing suppliers), or for more general information on the repair and replacement of traditional windows and doors, contact English Heritage's Framing Opinions campaign at Room 528, 429 Oxford Street, London W1R 2HD, or 071 973 3673.

Useful addresses

Technical data

The Building Research Establishment
Garston
Watford WD2 7JR
0923 664444

The Energy Efficiency Office
Department of the Environment
2 Marsham Street
London SW1P 3EB
071 238 3000

Energy audits

MVM Starpoint
16 Park Place
Clifton
Bristol BS8 1JP
0272 253769

The National Energy Foundation
Rockingham Drive
Linford Wood
Milton Keynes MK14 6EG
0908 672787

Trade associations

The Draughtproofing Advisory Association Ltd
PO Box 12
Haslemere GU27 3AH
0428 654011

The Glass and Glazing Federation
44-48 Borough High Street
London SE1 1XB
071 403 7177

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