

Cutting your heating

Energy-saving tips; Insulating your home, plus cutting out the draughts

These are ways to cut your heating bill with no initial outlay:

- **read your meters at least once a month** to keep you aware of spending
- **experiment with your central heating timer.** Try setting it to come on later and go off earlier. It's a myth that it is cheaper to leave the heating on. In summer, set the boiler to come on just long enough to heat enough water
- **use cheaper electricity** – if you're already on Economy 7, your immersion heater, and any other appliance you use during the off-peak period (seven hours between 11pm and 9am GMT – the times vary between areas), will be on the cheaper rate. If you use an immersion heater, it's worth having an Economy 7 meter installed, and using a time switch to run it at night.
- Economy 7 users pay a higher (around £2 a quarter) standing charge, and most pay slightly more for electricity used in the day. But three area boards – East Midlands, Eastern and South Eastern – have abolished the 'day rate premium'. This means you've only got to recoup the extra standing charge from the lower cost of electricity used at night. If you have a fridge and a freezer, you'll probably save most of this with these appliances alone
- **turn down room thermostats** (though older people and young children generally need higher temperatures). Each degree centigrade less can save seven per cent or more of your fuel
- **don't leave doors open**, especially outside and hall doors
- **turn off radiators in rooms you're not using** and keep the doors shut
- **keep windows shut** – if you're too hot, turn the heating down
- **switch off lights.** Frequent switching on and off can shorten the life of a fluorescent lamp – but if you're leaving the room for more than 15 minutes or so, it's still worth it. Don't worry about how often you switch ordinary tungsten lamps on and off
- **do a maintenance check** on your insulation every year or so, and look at your cylinder jacket and draught-excluders.

Energy-Savings with Home Improvements (£5.95) published by Consumers' Association, and produced in collaboration with the Department of Energy, gives more detail on all the improvements shown here. Available from CA, PO Box 44, Hertford, SG14 1SH.

The insulation it may pay you to install

Here's the key to the cost-effectiveness rating which we've given to each way of improving the insulation of your house.

★★★★★	Will pay for itself in a year or less
★★★★	Will pay for itself in 1 to 2 years
★★★	Will pay for itself in 2 to 4 years
★★	Will pay for itself in around 5 years.
★	Not worth doing on cost grounds alone
R	Worth doing only during renovation work.

Cavity wall insulation (1)

★★ Most houses built since the 1930s have walls with a 50 to 75mm cavity. For a typical semi it will cost around £400 to have it filled with urea-formaldehyde foam; £500 to £600 for mineral fibre or expanded polystyrene beads. Make sure the installer is approved by the British Standards Institution (BSI) or British Board of Agrément (BBA).

With u-f foam, there have been problems of formaldehyde vapour escaping into the house as the foam dries (if the foam is correctly installed in a suitable house, the vapour should escape outwards). Although problems are extremely rare, a very small number of people may risk suffering an allergic reaction from it. If you're worried about this, go for one of the dry-fill types – mineral fibre or expanded polystyrene beads – to be on the safe side (for more details see *Which?*, October 1985, p448).

Ask the contractor for a written statement that your walls are suitable for being filled. With u-f foam, the contractor should give you a statement that the work will comply with BS5618.

Timber-frame houses mostly have a high standard of insulation built in and shouldn't have their cavities filled.

Solid wall insulation

R Solid walls, found in older houses, are more difficult to insulate. Insulating externally, followed by rendering, is expensive, but may be worthwhile if your house needs renovating externally or re-rendering. You'll need 50mm of insulation to bring your walls up to present Building Regulations requirements. From the inside, thermal board glued to the wall, or foil-backed plasterboard attached to battens to give a 20mm air gap, is cheaper and lowers the heat loss considerably. But both these solutions are disruptive.

Loft insulation (2)

★★★★ You should have the equivalent of at least 100mm of mineral fibre blanket (the thickness required in new housing to meet the Building Regulations). It's worthwhile putting in 150mm if your ceiling joists are deep enough to take it. It's easy to install loft insulation yourself (it can be a messy, uncomfortable job, though, and you should wear a face-mask and protective gloves to prevent skin irritation). Alternatively, the job can be done by a contractor. It will cost around £160 (including materials) for a contractor to insulate an average-sized loft; around £50 less if you do the job yourself. If you have less than 30mm of loft insulation, or none at all, you can get a grant from your local council.

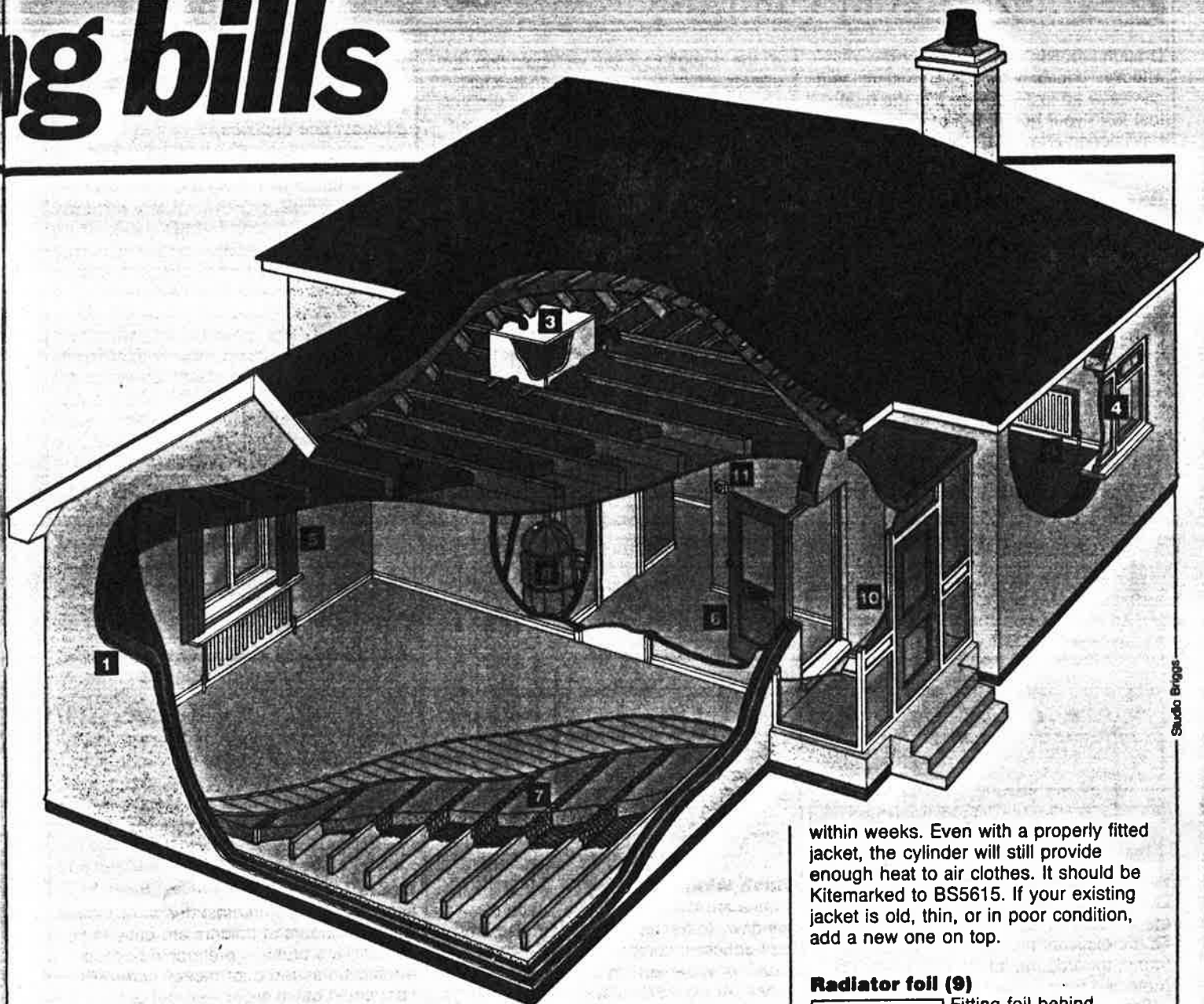
Insulate the sides and over the top of water cisterns (3) but not the bottom of the cistern or the loft floor underneath, and lag pipes to reduce the risk of them freezing. The loft space above the insulation should be ventilated, usually through the eaves, to prevent condensation. In older houses, you may need to provide ventilation, particularly if, as part of a re-roofing job, felt has been added under the slates or tiles. Don't forget to insulate the loft hatch.

Double glazing (4)

★ Double glazing isn't usually cost-effective unless you're replacing the window frames anyway. However, it can make you feel more comfortable. Installing secondary double-glazing (a separate pane of glass or plastic sheet attached to the inside of your existing window frame) is a fairly simple d-i-y job, and is cheaper than purpose-made sealed units or replacement windows. Make sure you would be able to open or remove the inner pane quickly in the event of a fire.

The Building Regulations currently limit the area of window on new houses by specifying an overall heat loss for the whole of the perimeter wall of the building – so if the windows are double-glazed they can be bigger. The economies of fitting double glazing when a new house is built should be investigated at the design stage – it may or may not be cost-effective. Lined curtains (5) can be almost as effective as double-glazing, particularly if they reach down as far as a radiator shelf, so trapping cold air behind them. But don't let them hang over the top of the radiator. Heat-reflecting curtain linings and roller blinds are also worth considering.

ing bills



Draught excluders (6)

★★★ Cheap, and well worth installing on poorly-fitting doors and windows. You should also seal cracks around pipes, skirtings and so on – see p482. We'd like to see draughtproofing fitted more extensively in new housing. A minimum level of ventilation is needed, though, to prevent condensation and to remove smells; in a well draught-proofed house, a mechanical extractor fan in the kitchen and bathroom may be needed. Heating appliances, except room-sealed gas heaters and boilers, and electric fires, need a supply of air to burn safely – with insufficient air they can produce toxic gases.

Floor insulation

R There's not much you can do with floors unless you're doing major renovation work or you can get access underneath – from a cellar, for example. Fitted carpet with thick underlay will cut down draughts.

Suspended timber floors (7) can be insulated with mineral fibre in the same

way as lofts, but you'll probably have to take the floorboards up to do it. Use plastic garden netting laid over the floor joists to support the insulation. Alternatively, you could use expanded polystyrene insulation supported by plasterboard nails (which have large heads) driven into the side of the joists. Make sure the air-bricks below the floor aren't blocked.

For solid floors, you can add an insulating screed, or insulation (for example, 50mm expanded polystyrene board) covered with flooring-grade chipboard over the concrete slab, but this means removing and refixing skirting boards and kitchen units, and shortening doors. The height to the ceiling, when you've finished, shouldn't be less than 2.3m.

The Building Regulations don't lay down requirements for floor insulation – we think they should.

Hot water cylinder jacket (8)

★★★★★ This will cost around £10 and will pay for itself

within weeks. Even with a properly fitted jacket, the cylinder will still provide enough heat to air clothes. It should be Kitemarked to BS5615. If your existing jacket is old, thin, or in poor condition, add a new one on top.

Radiator foil (9)

★★★★★ Fitting foil behind radiators on external walls reflects back heat which would otherwise escape.

It won't save you a great deal, but you'll soon recover the modest cost of the foil. It's more worthwhile the worse your wall insulation (and therefore particularly useful on solid walls). Ordinary kitchen foil will do, although specially-made radiator foil may be easier to stick.

Porches or draught lobbies (10)

★ These help stop cold air getting into the house when someone comes in from the outside. A lobby should be big enough to enable you to shut the outer door before you open the inner one. But it's not worth adding a draught lobby to an existing house purely as a fuel-saving measure.

Central heating controls (11)

★★★★ For details of the thermostats and controls you should have, see *Turning the heat on, Which?*, August 1986, p372.

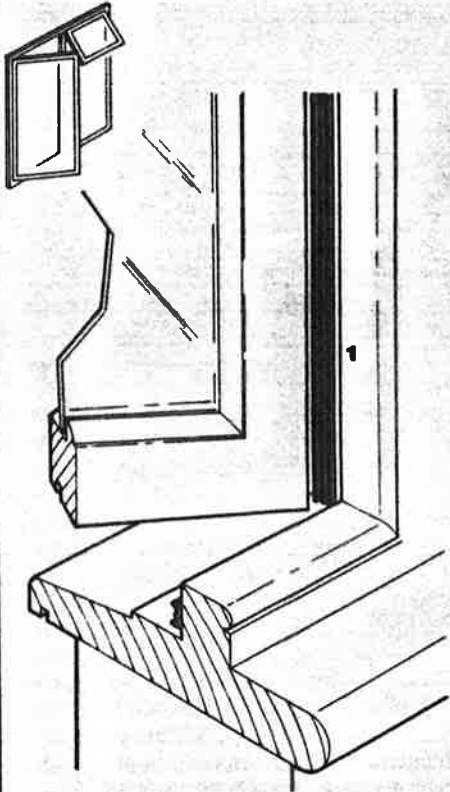
Draughtproofing your home

Draughtproofing can be very cost-effective because it's cheap to install and can save up to 15 per cent of the heat lost from your home. But there's a bewildering array of types of draught excluder available. We bought samples of

all the draughtproofers we could find, to assess which was best to use in which situation. We also asked experts to assess their likely durability. We left out simple self-adhesive foam types: these are cheap but don't last well. The pictures

below show the best ways of draughtproofing the main problem areas – for more information about each type of excluder see opposite.

What to use where



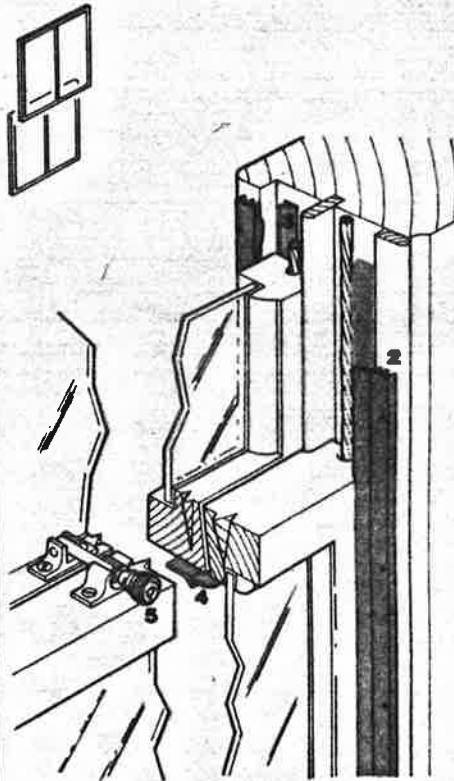
Hinged windows

On timber windows, self-adhesive compression seals (1) give good results. Fit the excluder around the sides of the frame, towards the inside where it will be protected from the weather.

For steel windows, there may not be enough room for most self-adhesive seals – applying silicone sealant, using a caulking gun may be better.

Some tips

- After draught-proofing, check that your doors and windows still open and close freely and that you can lock them and push bolts home
- you can get specially-designed excluders for your letter-box (around £3)
- seal the gap where the window-frame meets the wall outside using exterior sealant
- use quadrant or 'scotia' moulding to seal gaps between skirting-boards and the floor
- if you get draughts through your floorboards you can fill them with papier-mâché, or cover the floorboards with sheets of hardboard or a thick carpet. Don't block the airbricks which ventilate the space below the floor
- seal around pipes and cables coming up through floors, especially in cupboards and under stairs, and over keyholes in external doors
- don't draughtproof along the top of an internal door – this will allow some ventilation, and you're less likely to notice draughts at a high level.



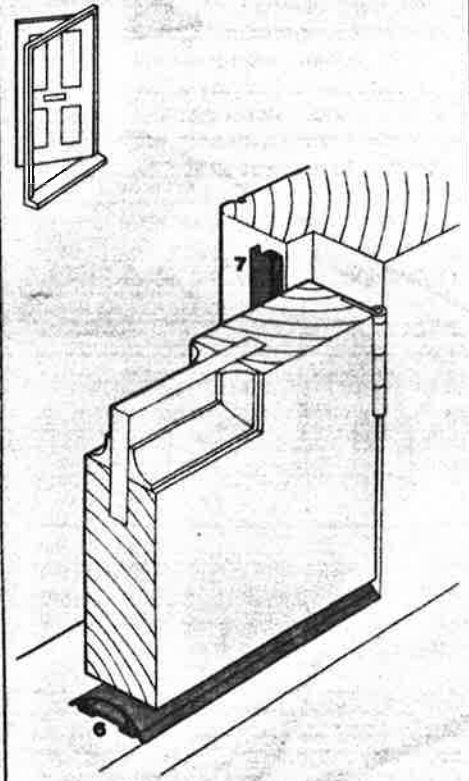
Sash windows

These are the most draughty type of window. At the top and bottom use any self-adhesive compression seal, or a brush or wiper seal in a similar way to the sides. At the sides of the bottom sash use brush or wiper seals in plastic or aluminium holders (2). For the top sash, the excluder has to be fitted from the outside, so use a wiper seal rather than a brush; when the brush pile is wet, it won't form a good seal. Alternatively, use a self-adhesive plastic V-strip or, if the gap is wide enough, self-adhesive brush strip, between the sash and the side of the frame (3). With the sash you're working on fully open, feed the last 50mm or so between the sash and the frame.

For the centre rail, either use self-adhesive brush strip on each sash (4) or a V-strip on one sash. Alternatively, use a brush or wiper seal in a PVC or aluminium holder – you may need a specially-designed centre-rail seal.

Copper alloy strip can be used all round a sash window. We found we could fit it without dismantling the windows.

'Brighton Pattern' screw-up window fasteners (5) draw the centre rails of a sash window together, helping to cut down draughts at this point. When fitting excluders to the rest of the frame, make sure that there's still a good seal with the fastener screwed up.



Doors

For the bottom of internal doors, brush or wiper excluders in holders are easy to fit. Generally, a brush is preferable because the friction as the door moves across the floor could pull a wiper seal out of its holder. Spring-loaded door-bottom excluders flip up when you open the door and don't rub over your carpet, but are more expensive and could make a noise.

A few door bottom excluders are available in wooden holders, which are robust and can be painted or stained to match your door. A normal brush excluder could be used on a sliding door, but we also found the Obo Under Door Excluder (£3.90), which attaches underneath the door and has the advantage of being concealed.

Excluders for external doors are generally screwed to the floor. When the door is shut, a flexible seal fits against either the bottom of the door (6) or its face.

To stop draughts around the sides and top of a door you could use self-adhesive compression seals, as for hinged windows. However, doors are more likely to warp, and wiper or brush seals in holders attached to the frame (7) are likely to be able to cope with this better. Fit the holders so that the excluder just begins to be compressed when the door shuts.

Self-adhesive excluders (around 30 to 40p per metre)

'Compression excluders', which are designed to be squeezed between two surfaces such as the window and its frame, are available in various shapes: 'E', 'K' or 'P' strip (in EPDM rubber) or V-strip in plastic or EPDM. Self-adhesive brush strip (usually nylon) is especially useful for sliding surfaces. They're suitable for gaps of up to around 9mm.

EPDM rubber isn't affected by sun or rain. If it's white, however, it may be discoloured by handling, while you're attaching it. A weak point is likely to be the adhesive, so the frame surface needs to be thoroughly cleaned and dried beforehand. A drop of contact adhesive or a tack at each end may help. Plastic V-strip can be affected by heat and sunlight, making it brittle so that eventually it fails to form an effective seal.

Self-adhesive excluders are concealed when the window they're attached to is shut. The only tools you'll need are scissors or a trimming knife to cut them to length.

Brush or wiper seals in aluminium or plastic holders (from around £1 per metre)

These should last longer than self-adhesive excluders. But they are more visible, they cost slightly more, and fitting them is more involved. 'Dual hardness' PVC excluders combine the seal and holder in one moulding.

They'll cope with gaps of around 10 to 20mm (30mm for the door-bottom types).

All these excluders are fixed in place

by screws or pins. You'd need a hacksaw, screwdriver and bradawl, or hammer, to fit them.

Copper alloy strip (50p per metre)

This is the traditional type of excluder and can be used in most situations. It can be cut with scissors but is time-consuming to fit, because it needs to be held in place by pins at 25 to 50mm intervals.

Silicone Sealants (around £1.50 per metre)

You apply this from a caulking gun to a cleaned window frame, with the window open. You stick low-tack tape (which may be supplied with the sealant) to the inside of the windows. You then leave the sealant to dry for 24 hours or so with the windows closed, moulding itself to the shape of the gap. The tape prevents the sealant sticking the window and frame together. When the sealant is dry you can remove the tape. We found this method was more time-consuming than fitting self-adhesive excluders; it wouldn't be convenient for doors, because of the need to keep them closed while the sealant dried.

External door bottom excluders (from around £3)

Compression excluders for under-door use generally require you to remove the door and trim a few millimetres off the bottom. They can cope with gaps of up to 25mm. The seals were mostly PVC, which can be affected by heat: grey PVC is preferable to black.

We found a variety of other excluders

mostly with either wiper or compression seals, or both. Most required the door to be trimmed, and some projected upwards by up to 30mm, so that you might trip over them.

We particularly liked the Halseal aluminium weather deflector (£2.95) which formed a seal against the face of the door. It was the only threshold excluder which didn't require the door to be removed and trimmed, and was the easiest to fit.

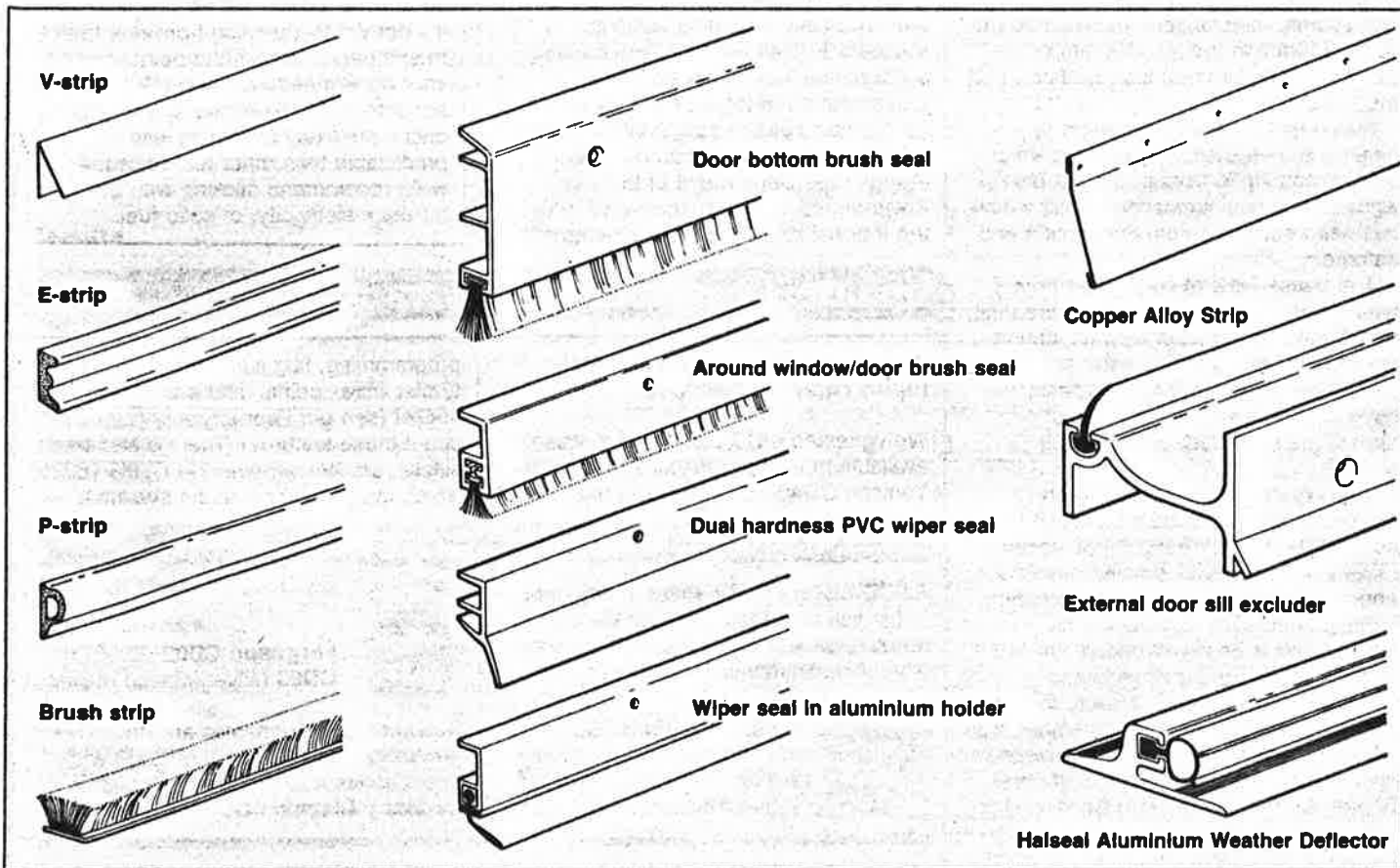
Tools needed: hacksaw, screwdriver, woodsaw, plane, bradawl.

Getting the work done

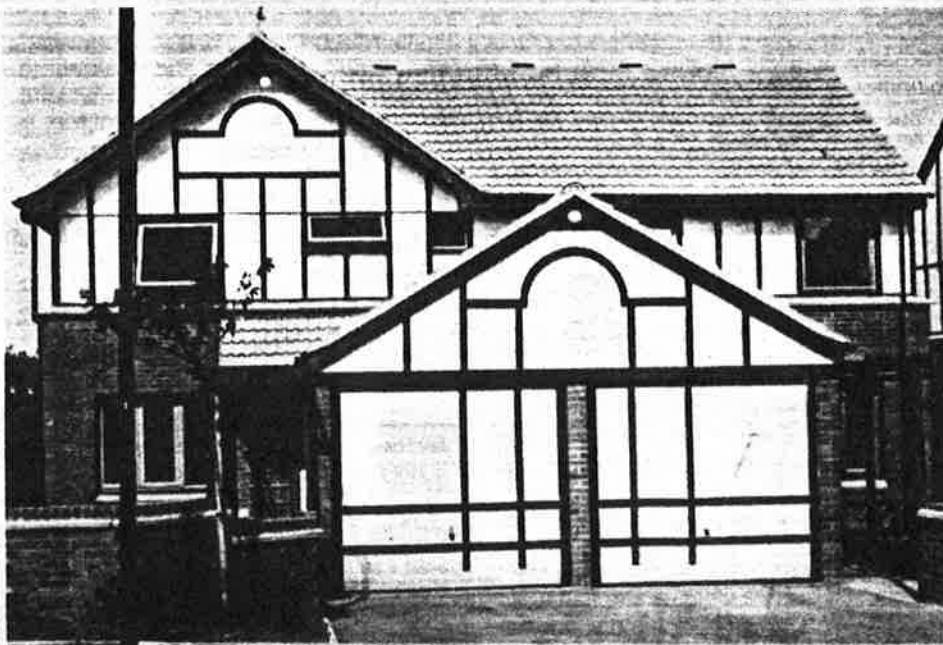
If you prefer to get someone to do the work for you, the Draught-Proofing Advisory Association, PO Box 12, Haslemere, Surrey, GU27 3AN, ☎ (0428) 54011 can put you in touch with a member.

Ventrolla is the name of a contractor-fitted draught-proofing system specially designed for sash windows. Polypropylene brush excluders in uPVC carriers are machined into the bottom rail of the sash window and the meeting rail. The existing beading is replaced by new timber or uPVC beading with draught-excluders built-in. The system is also said to reduce friction and make opening the windows easier.

We inspected the Ventrolla system installed on two sash windows at the house of a volunteer. The contractor took five hours to do the job, including fitting new catches. At a typical price of £70 to £78 for a 1800mm window, the Ventrolla system is not particularly cost-effective, but our volunteer was very pleased with the improved standard of comfort. Ventrolla Ltd, 51 Tower Street, Harrogate, N Yorks, HG1 1HS, ☎ (0423) 67004.



The ultimate in energy-saving



Remember how cold last winter was? The house shown above, in Milton Keynes, cost £30 to keep at a snug 20°C from September to April 1986

Even at an outside temperature of -15°C the house above needed the heating on for only two hours a day, at an output of 1.5kW (the equivalent of one-and-a-half bars of an electric fire). We estimate that an equivalent sized house built to current Building Regulations would have cost around £160 to heat for the same period (using gas central heating for eight hours a day).

The dramatic savings at the Milton Keynes house were achieved by 'superinsulation': the timber-frame house has 185mm mineral fibre insulation in the walls, 300mm in the loft, 100mm of extruded polystyrene under the floor, and triple glazing.

It also has an innovatory warm air heating and ventilation system, in which cold air coming in from outside is pre-warmed in a heat exchanger by air which has been extracted from the kitchen and bathroom.

The house was, of course, far from typical of how most new houses are built; but elsewhere in Milton Keynes, and in council housing in Manchester and elsewhere, results as spectacular have been achieved without major departures from traditional building practice.

The experience gained in Milton Keynes is being applied on a much larger scale at the Energy Park, a 121-hectare (300-acre) site which is being devoted to energy-efficient developments including housing, offices and factories. Its centrepiece is Energy World, a site of 50 houses by different architects and developers, which were open to the public during August and September. To get on to Energy Park, houses have to score 120 or less on the Milton Keynes Energy Cost Index (current Building Regs are equivalent to a score of 170: the lower the value, the better). Exactly how

this is achieved is left to the developer, and the houses on Energy World varied from the outlandish to houses which were adapted from standard designs built in volume elsewhere in the country.

The Energy Park will include permanent exhibitions and an information centre, helping people to learn from the experience gained.

Which? calls for action

In the UK we spend £37 billion a year on fuel. The cost of heating buildings accounts for half the total, and housing accounts for half this again. The Government's Energy Efficiency Office (EEO) would like to cut £2 billion from the current £9 billion spent on housing energy. The Department of the Environment is looking into ways in which the thermal insulation requirements of the

Building Regulations might be upgraded. But saving money is not the only benefit: a well-insulated house with a well-controlled heating system will also be more comfortable to live in and easier to keep warm.

For houses with less than 30mm of loft insulation – or none – there are grants towards installing it. Voluntary groups, working with the EEO and the Manpower Services Commission, have installed loft insulation or draught excluders in 170,000 homes. But much more remains to be done in other areas – wall insulation, for instance.

We'd like to see:

- the Building Regulations tightened to include stricter requirements for loft and wall insulation
- new requirements for floor insulation added to the Regulations; heating system controls included in the NHBC Technical Requirements
- draughtproofing fitted as standard in new houses, with extractor fans in kitchens and bathrooms
- grants towards adding wall insulation and heating controls to houses without these.

The message from all these things is: we could all be living in cheaper to heat, more comfortable homes. It's not difficult, or expensive, to build new houses, or refurbish old ones, to high standards of energy efficiency.

Fuel prices: good news for oil users

The big surprise over the last year has been the sudden plunge in the price of oil. For the first time since 1973 it's now competitive with gas, electricity and solid fuel. This underlines the advice we've given in previous years: it's not worth changing from one fuel to another, except at the point where your boiler needs replacing. If you're about to install a heating system, oil prices are likely to remain less predictable than other fuel prices, and we'd recommend sticking with gas, off-peak electricity, or solid fuel.

Update: Compact Disc players

(last Update May 1986 p242; main report February 1986 p65)

We've tested a CD player which wasn't available in time for our May Update, the Yamaha CD400 (£250). It has nine-track

programming; fast audible search, access to disc index points, and a headphone socket (see our February report for more about these features). There's also a similar, smaller version, the CDX3 (£230), which matches 'midi' audio systems:

BUYING GUIDE

All CD players so far sound pretty good, but in listening tests the Yamaha didn't do quite as well as the best we've tested. So our recommendations are unchanged:



Philips CD 150B (£200) (being replaced, but should still be in the shops), or the similar **Marantz CD45** (£210)



Ferguson CD02 (£250) or **CD03** (silver instead of black)

Recommended portables are: the **Technics SLXP7** (£230, or £300 with headphones and rechargeable battery) or the **Sony Discman D50 Mk II** (£270).