Stop those costly gaps!

Effective draught proofing can save as much as £50 to £60 per house and the county £1.150 million

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In all buildings, there is a multitude of potential air leakage points, many of which are impossible to seal. However, components such as doors and windows are easily accessible and effective draught proofing measures can be taken to arrest the heat loss these areas represent.

Entry of cold air through gaps around windows and doors in UK buildings accounts for a wastage of some 15% of the country's fuel bill for space heating. This amounts to some £1,150 million wasted per annum. Adequate draught proofing can cut this loss in half, yet the investment cost is paid back often within the first heating season. At the present rate of progress, it would take more than 20 years to draught proof all appropriate buildings. The Draught Proofing Association regards the matter as much more urgent than this, if serious attention is to be paid to conserving fuel in this country.

Government research shows that savings between £50 and £60 can be made against annual fuel bills, if a house is effectively draught proofed. Thus, if a similar sum is spent on well designed long lasting draught proofing materials, this should be recouped within a year.

These encouraging figures are based on typical annual heating costs for detached, semi-detached and end of terrace houses, using oil, electricity or solid fuel. In the same houses where gas, which is a cheaper fuel, if the heating source, savings of between £30 and £35 can be expected.

Draught proofing on smaller properties is equally cost-effective; bearing in mind the low material costs. For instance, the average savings per year in flats, following this form of insulation are likely to be £20 and to £25 for most fuel types, against an outlay of just £30 (retail price).

The considerable benefits of draught proofing as a worthwhile energy conservation method are recognised by government and this form of insulation is currently being promoted through their Energy Efficiency Office.

The 'Stop-a-Draught' promotion which took place in February, as part of the Government's Monergy '86 campaign, produced sales increases of up to 439% for draught-proofing manufacturers. This indicates that the draught proofing message has been firmly sewn in the minds of the public.

Despite an increasing awareness among the general public of the need to conserve energy, the majority of British companies still overlook the need to be energy efficient: yet every sum saved is profit. For every £1 spent on a survey to discover the causes of wasted energy, resulting improvements are likely to show savings of £80.

For instance applied to a medium sized factory, with an annual heating bill of, say, £150,000, efficient draught proofing could mean a saving of £2,500 per annum, for a total outlay of only £2,000.

In addition to being economically viable, draught proofing has other advantages. For instance warm, draught free conditions are more conducive to work and therefore result in increased productivity. In an economic situation, when it is often difficult to maintain the minimum statutory working temperature of 19° it should be understood that, just as draught proofing helps retain the heat, so it also keeps ouot the cold and damp.

Now that Building Regulations for all new buildings require walls to be insulated to give a U-value of 0.6W/m²K, draught proofing of windows and doors has become a key area of concentration for those involved in energy management.

Average gap

The average gap around a window is 2mm and around exterior doors (including the bottom gap, which is often unnecessarily large) is 6mm.

Indeed it is anticipated that pressure from industry, when buying properties, will lead to automatic inclusion of built-in draught proofing in all new buildings in the future.

In this context it must be recognised that windows and doors are one of the most important components in a building and as such only those manufactured to a high standard should be selected. They are the only elements that open and close, making them the most vulnerable areas in adverse weather conditions.

The biggest potential source of draughts in an industrial building is the major entrance and exit routes — roller shutter, folding shutter, sliding or sectional overhead doors. The immediate response to draught proofing such large openings could well be 'what's the point, when the heat is lost to the outside atmosphere so quickly when they are opened to let a load in or out?' This ignores a very important point, however, namely the base temperature which can be maintained during the night and so the boiler can be turned on up to an hour later to bring it back to the required level.

Double-swing entrance doors, which are a high traffic area, are another major potential source of leaks. Although they may have a seal fitted to the vertical stiles, more often than not the horizontal sections have been overlooked.

Draught proofing needs to be 'understanding' in use, as it may have bolt head or similar gadgets which need to pass through it without damaging its weather-sealing properties. As far as possible, it also needs to be vandal proof, but since accidental damage may occur, the exposed part of the seal (as opposed to the fixed carrier) should be replaceable. Another important property of industrial draught proofing is its ability to keep rodents at bay, particularly in places where food or edible goods are stored.

In industrial application, it is possible that the seal will be set against rough bricks or concrete. Since the bottom or sides of the doors may slide over dust, grit or other 'inconsiderate' surfaces, resistance to abrasion is an important requirement, likewise resistance to pollutants which could impair its sealing action.

Three factors

Draught proofing is the only insulation medium that is subject to three major factors; human interference — opening, shutting and painting; environmental — water, heat, dirt and ozone; mechanical stress — compression as the seal is deformed.

In the majority of cases, draught proofing is carried out ot upgrade an existing building, whose windows and doors are made from wood, metal or a combination of both. Regardless of whether these materials are built in during manufacture, or retrofitted, the seals are broadly the same.

The wide scope of products on the market includes diverse materials, types

of strip, fixing methods and operation, but overall the strips fall into two categories — compression seals and wiper seals.

Compression seals are used where the fixed and moving edges of a door or window are butted together in the closed position and are designed to deform at these points and fill the gap between them.

These are probably the most widely used, and, in recent years, their standard of manufacture and performance has improved dramatically.

Wiper seals must be used for sliding sash windows and sliding doors. These form an effective barrier to air movement around perimeters, without creating excessive friction between the sliding elements.

The importance of durability in a draught proofing system cannot be over emphasised, rather than the cosmetic aspect, although it still needs to blend in with the buildings wherever possible. The other important considerations are quick, trouble-free installation and extended periods between replacement.

Hollow strips — O and P section; solid strips — angle or V profiles; and cellular flat or rigid strips, are the commonest types used, mounted to the door or window by a variety of methods.

For factory-fitted strips 'foot' mounting is common, formed to fit into a groove, machined or formed in the frame itself. Some strips have a hard foot to simplify installation; others are pushed into place with a very simple hand tool.

Alternatively, strips may be tacked or stapled into place or be supplied with reinforced self-adhesive backings, cut to shape and struck down.

Provided proper attention is paid to positioning the strips in the frames and the correct clearances are left for them to operate without needing excessive force to compress them, compression seals are the simplest, most cost-effective way to weatherstrip the vast majority of windows and doors.

Alternatives

An alternative type of compression seal is that manufactured from a rigid backing strip, with a high density pile brush of synthetic fibres attached to it. This is fitted — using pins, screws, bolts, rivets or adhesive — within the existing window or door frame, so that the moving element comes into contact with it on closing, shaping the pile seal against its backing. Additionally, a range of dual hardness plastic sections can be used, that simply and economically provide an effective draught sealing medium.

Brush seals, specially recommended for industrial applications, are available in a comprehensive range of lengths and brush depths, suitable for draught proofing roller shutter, folding shutter, steel hinged or sectional overhead doors and for many other applications. Manufactured from hardwearing nylon filaments and usually housed in aluminium carriers, these products offer a long-term and highly effective means of sealing against draughts. Additional benefits include reduction in ingress of dust, dirt, leaves and windblown snow.

Contour insulation foam cutting

If you have never heard of Raam Engineering its hardly surprising — as this family run business has only been in operation since January of this year. Although the company is only nine months old managing director Raymond Murphy has many years experience in the foam manufacturing industry, in fact he has been in the business for 20 years.

Based in Skelmersdale, Lancashire, Mr Murphy's firm manufactures and installs the Contour cutting machine, a machine able to cut complex shapes from rigid and flexible PUfoam, without requiring a template or drawing. The cutting wire follows a pre-programmed pattern which has been programmed into the microprocessor of the machine. This absolutely accurate line guide makes this machine into a universal multi-purpose cutting machine as even the most complicated contours can be cut without problems. A considerable material saving is achieved as the required components can be tightly interlaced with each other. Contour cutting machine model Raam 2/3000 CNC can handle a range of foam blocks. Machine has a working width of 2200 or 2500mm, cutting height of 1300 or 1500mm and table length 2200, 2700 or 3200mm. These shapes can in turn be used for thermal pipe lagging insulation.

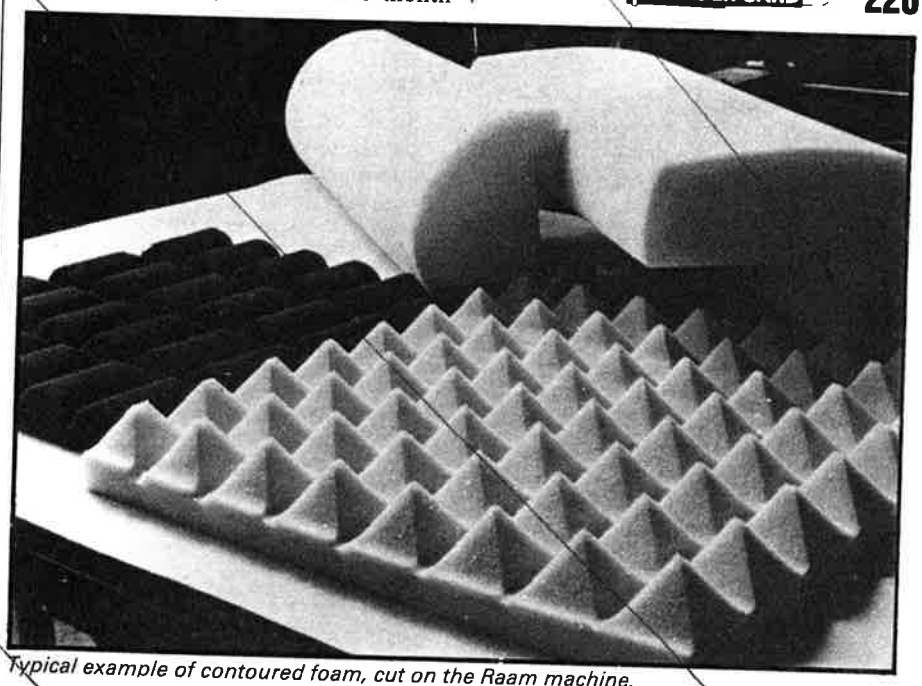
The machine, excluding the multi-processor control system, is made from start to finish at Mr Murphy's factory, everything from nuts and bolts to the specially developed cutting wire is manufactured on site. Safety standards are to the highest order, Mr Murphy informed Insulation Journal, and a twelve month guarantee covers the machine for both parts and labour. So far one machine has been sold to the insulation industry.

Full operator training is given on both the cutting machine and the multi-processor which is supplied through an electronics company. Operation is not complex, simply programme the desired pattern and dimensions into the processor, this will then be displayed on a screen so that the operator can see at a glance the programme information, switch the machine on and the foam block will be cut to the required dimensions.

For anyone interested in viewing the machine it will be on display for two weeks from Monday 22nd September.

READER CARD → 220

View of the micro-processor control panel



Typical example of contoured foam, cut on the Raam machine.