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JUNE 1991

**CABLES &
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Management skills

VENTILATION

Time to freshen up

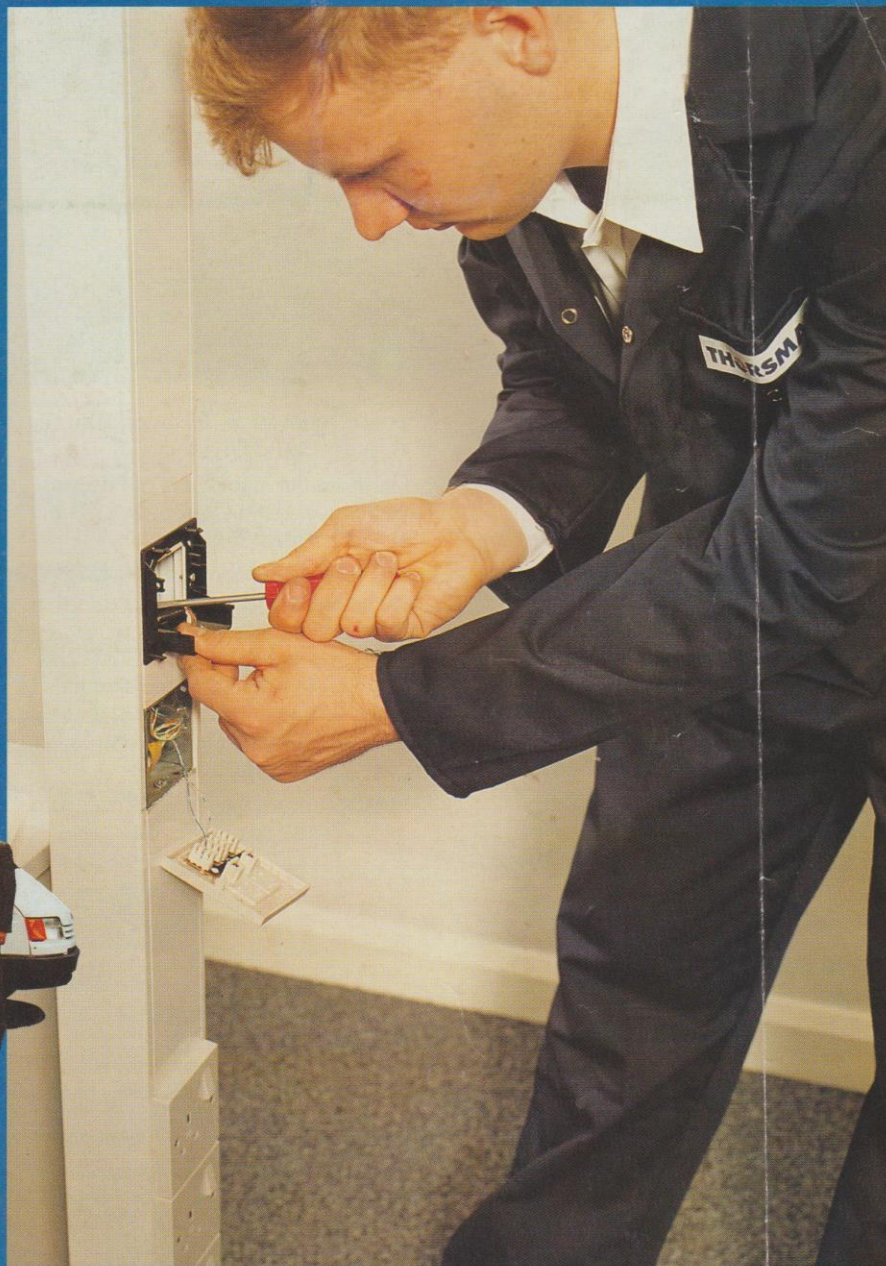
**BUSINESS
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**PE OF THE
YEAR**

Meet our champion



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CABLES AND TRUNKING

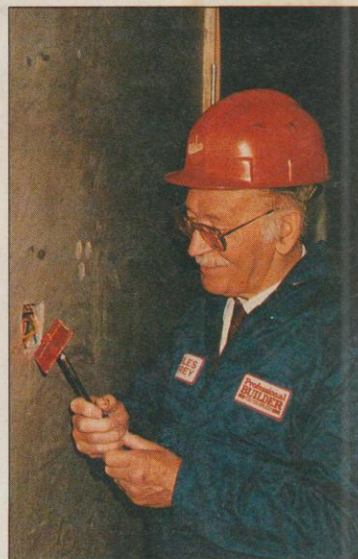
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VENTILATION

Pick and fix

Next time you have to install a ventilation system make sure you consider all the aspects involved. Graham Brakeley, Woods of Colchester, breezes through some pertinent questions.

As competition in the service industry increases, the call on those who work within it becomes more varied, and with it, a requirement to have a wider range of knowledge to enable customer satisfaction to be met.

Installing a ventilation fan is one thing, being asked to advise on what type or size of fan, or even the number of fans required for the application, is another. Perhaps the simplest way to identify ven-

tilation requirements is to divide them into ducted and non-ducted systems. The non-ducted system requires the fan to be mounted either in the wall or roof and the applications covered include ventilating workshops, laundries, garages, boiler houses, cafe's etc.

In many areas within a building mechanical ventilation powered by fans becomes necessary and will often be a legal requirement. The rate of ventilation measured in litres of air per second must be sufficient to satisfy the following three requirements:

- Sufficient air movement throughout the room or building to prevent the formation of pockets of stale air.

- Sufficient fresh air supply and foul air exhaust to limit the level of air pollution from all sources in the building, including humidity.

- Reduction of air temperature, within the limits set by the climate, by removal of heat generated within the building or supplied by the sun.

The simplest method of determining the ventilation rate required is to make use of the accumulated experience of the industry expressed in the table of air change rates shown. The volume in cubic metres of the space to be ventilated is estimated and multiplied by the number of air changes per hour (see table) to give the ventilation rate in m³ per hour. Division by 3.6 converts this to litres per second.

$$\text{Ventilation Rate (litres/s)} = \frac{\text{Volume (m}^3\text{)} \times \text{air change rate}}{3.6}$$

Provided air inlets and outlets are properly sited, the tabulated values will be sufficient for most requirements. However, particular installations should always be checked against the following:

- Are there any bye-laws or other legal requirements applicable in the locality?

- Is the space expected to become so crowded that a higher ventilation rate might be obtained by calculating on a per person basis?

- Are there abnormal sources of heat and fumes?

- Is it desirable to provide a higher ventilation rate for summer cooling?

- Is smoking allowed?

In most smaller applications, the siting of fans is relatively simple and often dictated by space or available access. At Woods of Colchester we have a range of products to satisfy such applications. All are available for connection to either a single or three phase electrical supply and all are designed and manufactured to ensure operation in humid atmospheres with motors protected against the ingress of water and dust.

Duct work

More complex applications will require more complex calculations with resultant duct work. The most popular of these is the light commercial kitchen extract system installed in public houses. In order to offer a more varied service to its clientele, breweries and the catering market have encouraged public houses to offer food to augment their more traditional sales. Local bye-laws often require food preparation areas should be adequately ventilated in addition to ensuring that cooking fumes do not penetrate into the lounge and bar areas situated elsewhere in the premises.

In general, the ventilation rate within this type of kitchen is dictated by the amount of air/fumes being extracted via the cooking range hood system.

Normally there are two main types of hood — wall mounted, where the wall itself makes up the fourth edge of the hood, or an island range where access is from all four sides. When considering blanking off the hood about 50% reduc-

Air change rates

Situation	Air Changes Per Hour
Assembly Halls	4-6
Bakeries	15-30
Banks	2-4
Bathrooms	6-8
Bars	6-8
Boiler Houses	15-30
Cafes	8-12
Canteens	8-12
Churches	1-10**
*Cinemas	6-10
Classrooms	2-4
Cleaners	15-30
*Dance Halls	8-12
Domestic Kitchens	10-15
Dyers	15-30
Engine Rooms	15-30
Foundries	30-60
Furnace Rooms	30-60
Garages	6-10
Hospital Wards	6-8
Hospital Treatment Rooms	6-8
Kitchens for Restaurants	13-30
Laboratories	4-6
Laundries	10-15
Libraries	2-4
Offices	6
Paint Shops	30-60
Residences	1-2
*Restaurants	10-15
Storage Areas	1-2
Swimming Baths	15-30
*Theatres	6-10
Workshops	6-10

*General requirements are applicable to the table, 28m³/h per person minimum in public places; more if smoking is allowed.

**Dependent on height of building and number of persons.

VENTILATION

tion is the norm. It is possible to reduce the volume flow further by increasing the blanking plate area such that the slot around the hood perimeter is no smaller than 300mm.

However, it is then necessary to increase the velocity to 0.75 m/s (150 ft/min) to capture the steam/cooking odours. The volume flow in m³/s would then be the overall slot area in m² multiplied by the velocity of 0.75 m/s. The blanking off plate should be 'dished' to

prevent condensation falling into food and should be easily removable for cleaning and to allow access to grease filters.

Fires in the ducting have been caused by a build up of grease. In all kitchen hoods it would be wise to have grease filters fitted. These should be sized against the volume flow rate required. The majority of filter manufacturers will supply detailed specifications of their hoods including size.

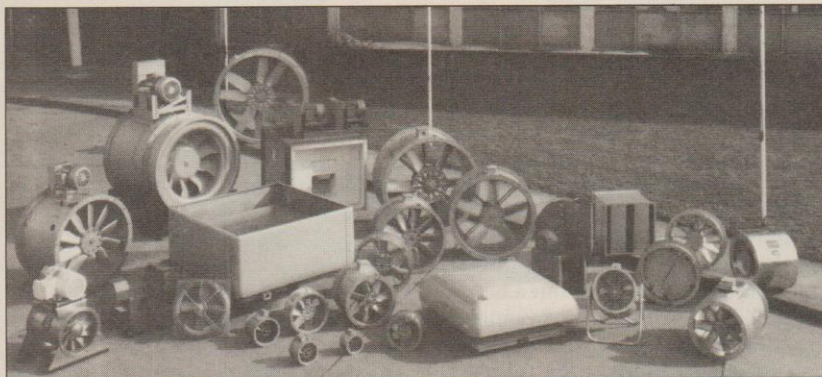
The recommended velocity through a wall mounted hood is 0.5 m/s and through an island hood 0.6 m/s. This is the velocity at the opening into the hood. A 2m wide by 1m deep hood will have an area of 2m². The extract rate in m³/per second will be calculated:

$$\text{Volume flow (m}^3\text{/s)} = \text{Hood area (m}^2\text{)} \times \text{velocity (m/s)}$$

In addition however there will be a requirement to check the volume flow calculated and relate it to the actual kitchen size. It may be that to satisfy one set of rules, the air change rate may be excessive for the catering staff's comfort. Temperature also plays an important role in the final selection. In barbecuing applications where the temperature tends to be in the 80°C to 90°C region, bifurcated fans with the motor out of the airstream are a must.

It should be emphasised, however, that such guidelines provide only some basic principals behind simple ventilation applications. Seldom are any two applications are identical and if in doubt it is always best to consult an expert.

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A selection of the smaller range of products manufactured by Woods of Colchester.

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VENTILATION

Mist opportunity

The latest Building Regulations offer some opportunities for both electrical contractors and householders alike.

Robert Pasterfield of Silavent explains.

It is just over a year since the new building regulations on ventilation (F1) came into effect and, whilst most electrical contractors are fully aware of their existence, some are still unsure of the implications.

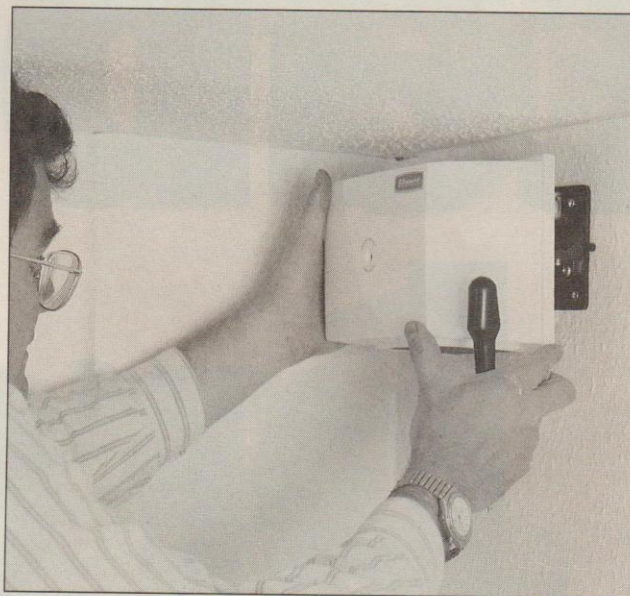
The regulations quite simply recognise that moisture in the form of condensation can damage the fabric of a building whilst stale air and odours are a potential health hazard. The primary object is, therefore, to ensure that moisture is extracted from the rooms where it is produced, namely kitchens, bathrooms and shower rooms. If moisture laden air is effectively extracted it is reasonable to assume that pollutants will be taken out at the same time.

Apply within

So to what buildings do the regulations apply? The areas referred to in the document are habitable rooms, kitchens, common spaces in buildings containing two or more dwellings, bathrooms and sanitary accommodation. How each is defined is set out very clearly. What is not stated is whether these definitions refer to areas in new constructions, major refurbishments or in existing properties undergoing home improvement. We would regard them as referring to all three categories.

For example, with a home improvement when an existing bathroom is being refitted then not only should it be fitted with mechanical extract ventilation but that ventilation should be capable of extracting at a rate of not less than 15 litres per second in accordance with clause 4.1 of the regulations.

The home improvement situation, where you are called in to carry out the work, is one in which you might well also act as the specifier. The onus is then on you to choose the fan having drawn to the attention of the householder both the



Installing some means of mechanical ventilation represents added value to the contractor.

current regulations and their positive benefits. It goes without saying that installing some means of mechanical ventilation represents added value to the job and so both you and the householder will benefit in the long run.

False economies

On the question of fan selection it is worth noting that whilst axial fans are of a simpler design and, therefore, less expensive than centrifugal models they are only capable of extracting air when fitted to short ducting runs and should only be fitted in windows or in 'through the wall' applications. Centrifugal fans are capable of extracting air over larger distances and should always be fitted in internal bathrooms and toilets or where the ducting run exceeds 2 to 3 metres. Although no doubt you will be under pressure to quote a low price, it is worth remembering that a cheaper fan in the wrong situation might well result in a false economy.

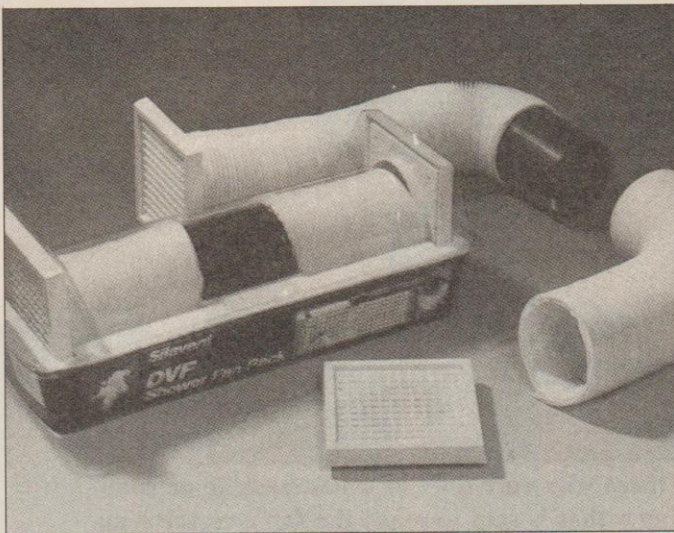
The phrase 'if used' in the guidelines is very significant. The biggest complaint about large fans and, indeed, about cooker hoods, is noise. It's no good having a powerful extractor which nobody is keen to switch on. This applies particularly to kitchens where a fan must be capable of extracting 60 litres per second and a cooker hood must be capable of extracting 30 litres per second. Both may be operated periodically during cooking and the noise factor, therefore, is quite significant if this criteria is to be met.

At Silavent we are now fitting sealed ball bearing motors into many of our products which are not only quiet running but also longer lasting. Our new Kitchenaire 2000, for example, can be fitted with a variable speed control allowing the fan to run continuously at low speed but boosted to extract 80 litres per second at full speed when cooking is taking place.

Continued on page 48

VENTILATION

Silavent's shower fan pack is designed so that the fan and all the electrics are located in the dry roof space above the shower.



Cooker hoods are located right above the area from where much of the moisture and kitchen smells come from. The same cannot be said for conventional fans. For obvious reasons they cannot be located too close to flowing water even if they are splashproof.

We have addressed that particular problem and come up with the solution — an innovative shower fan pack designed so that the fan and all the electrics are located in the dry roof space above the bath or shower. Flexible ducting leads from a grille in the ceiling and dis-

charges through a grille in the soffit or gable end wall. But whether a conventional fan or a shower fan pack is installed, compliance with the new regulations will lead to less condensation.

Condensation cures

Over the years it has been found that properties with integral bathrooms and mechanical ventilation suffer less condensation related problems than conventional bathrooms with windows. People just do not bother to open the windows! It is also a fact of modern life that many householders, in an effort to conserve energy and reduce fuel bills, are now installing double or secondary glazing. This additional insulation is also leading to greater condensation which can only be cured with proper ventilation.

The new building regulations on ventilation (F1) therefore are positive and beneficial and not simply another piece of bureaucratic nonsense. They were drawn up for very good reasons and it is in everybody's interest to adopt their recommendations.

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VENTILATION

It's airlementary

Ron Hendrick from Greenwood Airvac shows how the company's new extract fan enables installers to meet the new building regs and save on fixing time.



The installation of ventilation equipment in domestic premises is enjoying something of a boom at the moment following last year's introduction of new building regulations. The 1980s witnessed a great deal of emphasis on the need for energy efficiency and thermal insulation and as a result the benefits of ventilation were largely ignored. But attitudes have now changed and the problems of condensation and stale air are now high on the list of priorities to be tackled.

The regulations set out the need to encourage the use of ventilation without it affecting security or comfort levels. Rapid ventilation is required in those areas which produce condensation in any significant quantities such as kitchens, bathrooms and shower rooms. Moisture laden air is a particular problem in kitchens, of course, and the regulations state that extract rates in this part of the house should be 60 litres/s or 30 litres/s if the ventilation is incorporated in a cooker hood.

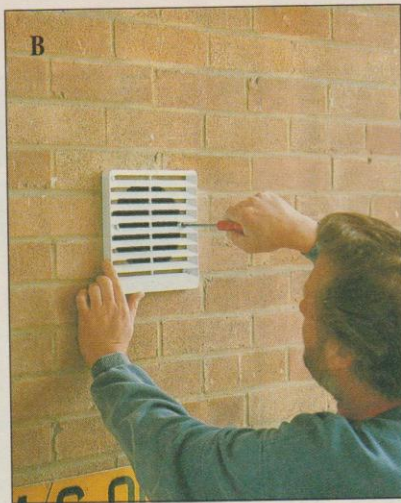
Our new kitchen axial flow extract fan, offering an extract rate of 61 litres/s, has been specifically designed to meet these requirements. The AX-K, however, offers more than just a high level of performance. Installation efficiency is also ensured as the fan can be easily win-

dow or wall mounted by means of EW2 or ED3 fixing kits which have been specially produced in order to help the contractor to reduce labour costs.

The ED3 is a plastic wall-mounting duct system, supplied in two sections which simply slide together. Fixing can be completed in one visit as the fan is fixed directly to the duct, doing away with the need to wait for grouting to dry

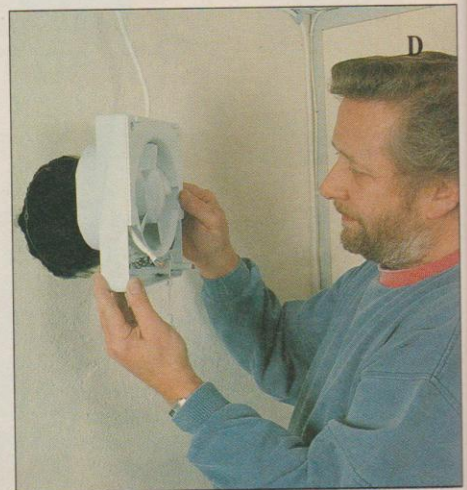
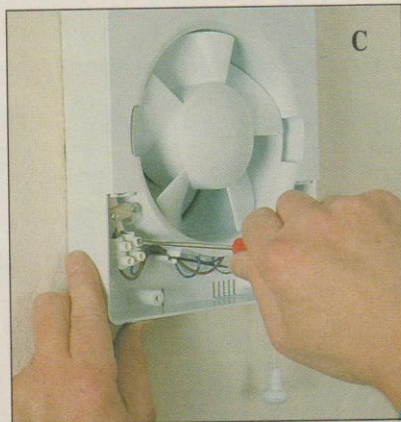
before completing the installation. The EW2 window-mounting kit allows installation into single and double glazed windows. Consisting of two plastic spacers and a window seal, it will also reduce fixing times considerably.

But just how easy is the AX-K to install? What follows is a step by step guide to both wall and simple window mounting.



WALL MOUNTING

1. Knock a hole in the wall to accept the ED3 duct or soil pipe, making sure that there is a slight fall to the exterior.
2. Cut the two halves of the ED3 to the width of the wall and slide together before inserting into the hole (see pic A).
3. Grout the ducting into the wall, ensuring that the screw holes are horizontal.
4. Fix the external grille to the duct on the outside wall (see pic B).
5. Arrange external wiring as appropriate. Push 2-core cable through from the back of



VENTILATION

the fan and secure wiring in the cable clamp (see pic C).

6. Fix screws to the ED3 duct leaving a gap. Engage these screws in the two keyhole slots in the back of the fan, ensure the fan is level and tighten the screws. Push fit the screw covers.

7. Connect Live and Neutral wires to terminal block (see pic D).

8. Fit the electrical cover.

9. Fit the internal grille over the front end of the fan and secure with a retaining screw. The fan is now ready to operate (see pic E).

Alternatively, if a length of soil pipe is used, you will have to wait for the grouting to dry before drilling and plugging holes in the internal and external walls. These holes can then be used to fix the external grille to the outside wall, and the fan to the inside. Waiting for the grouting to dry may mean that you have to make two visits to the site. Use of the ED3, however, will ensure a simple one-visit operation as the screws are secured directly into the duct.

WINDOW MOUNTING

1. Cut a circular hole in the window.

2. Take the two spacer elements of the EW2 fixing kit and fit a seal to each.

3. Fix the exterior grille of the fan to the external spacer using the two screws provided, insert the small slide-fit blank to cover the cable entry hole.

4. Taking the internal spacer element, pass the cable through the entry hole in the top surface and out through the front.

5. Holding the internal and external elements in position, fix the two fan spacers together either side of the glazing hole.

6. Complete wiring and replace electrical cover of fan. Slide cover over cable entry hole.

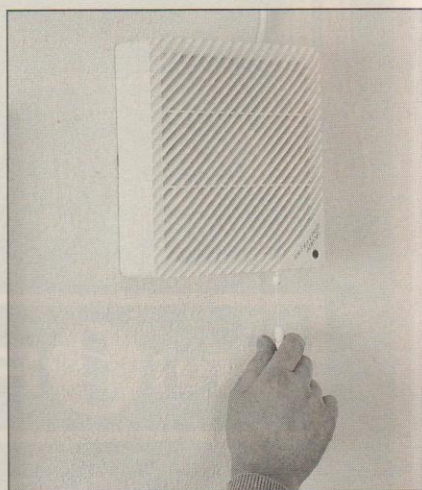
7. Fit the fan body to internal spacer and push fit screw covers.

8. Fit internal grille over front of fan and secure with retaining screw.

AX-K fans are manufactured from tough high-gloss white plastic and all external elements have been UV-stabilised to prevent discolouration. Although supplied complete with an integral pull cord

switch, they can also be used with a remote switch or the Greenwood Airvac HH3 remote sensor. The sensor will automatically activate the fan over a pre-set relative humidity or temperature rise, thereby helping to ensure maximum efficiency in use.

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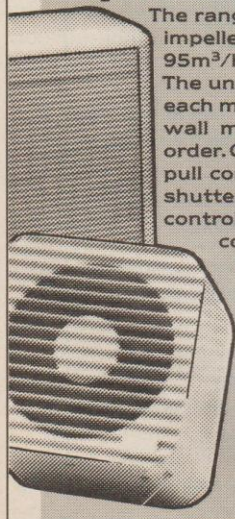
STUDIO LINE

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The Studio Line range of speed controllable window and wall fans offers a stylish yet economical answer to today's domestic and light commercial ventilation needs.

The range covers fans from 4" to 12" impeller diameters with duties from 95m³/hr to 1400m³/hr.

The units are easy to install and as each model is capable of window or wall mounting they are easier to order. Options include run on timers, pull cord operation and automatic shutters and the RVN-R speed controller provides variable speed control for precise adjustment of fan performance.



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VENTILATION

Easy does it

Living standards and environmental problems are among the most talked about issues of the day. But there's a relatively simple way to ease public anxieties. Vent Axia's David Vincent explains.

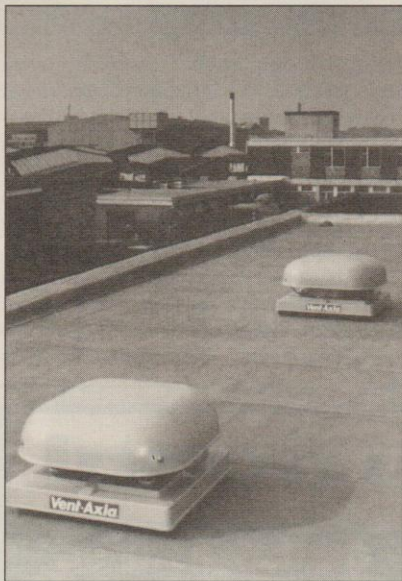
One of the genuine ironies of contemporary life is that whilst new buildings ostensibly offer very high environmental standards, many actually have a poor internal climate — at best rather stuffy and uncomfortable, at worst unhealthy. Despite the amount of trouble taken over the design of buildings and the systems which serve them, the fact is that occupants are all too often disappointed by their living and working conditions.

At the domestic level, the preoccupation with reducing heating bills has encouraged structural insulation, double glazed windows and draught sealing — all of which are very effective in saving energy. However, draught sealing in particular brings with it the problem of condensation. Moisture-laden air produced in bathrooms and kitchens does not escape from the dwelling but travels to the relatively cooler surfaces in halls and bedrooms, where water is deposited to provide the breeding ground for fungus, the starting point for stale air, and rotting of the building fabric — a problem exacerbated by the absence of natural ventilation through chimney flues in many modern homes.

A fresh approach

In larger institutional office buildings, properly designed and operated air conditioning can provide an excellent indoor climate. But problems arise when, for example, over-zealous energy managers override the controls and run such systems continuously on minimum fresh air or even full recirculation, relying on the very small amount of air infiltration through doorways to provide the essential fresh air.

Today there is greater awareness of both personal health and environmental issues, and so it's easy to see how dissatisfactions arise. Every other news item



Roof extract units are suitable for removing hot, stale air from factory workshops.

seems to focus on the health hazards presented at work and at home by industrial processes and poor hygiene, many of which can be solved by better ventilation. Anxieties about the accumulation of Radon in buildings can be efficiently controlled by powered extract ventilation to dissipate the problem altogether.

So maybe we should stop making people fit the home, office or factory and start making buildings suitable for people. It's time to start providing sufficient ventilation where it's needed and for as long as it's needed to keep air contamination levels within bounds, prevent contamination, and provide a healthy environment. At the same time the energy costs and more general pollution of the outdoor environment must be kept to an absolute minimum if solutions are to be ecologically sound.

Legislation and building codes of practice, of course, help a great deal.

Document F of the 1990 Building Regulations gives clear guidance and sets a basic standard for powered ventilation of kitchens, bathrooms and sanitary accommodation on domestic dwellings, and is an excellent current example. Similarly, the COSHH regulations will have a big impact on industrial ventilation by defining the necessary standards of air quality and calling for management procedures to ensure continuing protection.

Solutions need not be complex. Indeed there's a great deal to be said for simplicity. Just what 'simplicity' means, however, depends a great deal upon the design, construction and usage of the building concerned. Retrofitting a centralised air conditioning system and as-



Vent-Axia's Meteor System 3 wall fan heater.

sociated ductwork into an existing office building will probably be a far more complex and costly operation than installing this type of system into a new building under construction. In a domestic building, this problem hardly arises, although neatness and ease of installa-

VENTILATION



Large office areas can benefit from Venti-Axia's T-Series.

tion are important design aspects of products for these applications.

The big advantage of controlled ventilation systems is that they are quick and easy to install, and offer local control of the internal environment. Occupants are not obliged to suffer someone else's idea of comfort, but can choose their immediate environmental conditions for themselves at the touch of a switch — assisted by automatic air-quality, humidity and temperature sensing controllers whose

operational parameters can be set to suit occupants in the immediate vicinity of each ventilation unit.

In addition to providing such a high level of individual control, unit ventilation also avoids the air contamination and health risks associated with poorly maintained ductwork and filtration.

The sophisticated modern controllers now available for unit ventilation equipment mean more efficient use of energy too, because they operate fans only when

needed to restore the chosen environment. This keeps operating time to a minimum. So primary electrical consumption to remove overheated, stale and humid air is reduced, and during cold weather, the extraction of valuable warm air is also minimised.

So unit ventilation combined with locally placed electrical controls creates comfortable and potentially healthier indoor environments in domestic and commercial premises. In the broader context of the environment as a whole, ventilation rather than full air-conditioning dispenses with the need for possibly harmful refrigerants and the associated energy costs of operating chilling plant.

Of course, environmental considerations will force the pace of improving building design standards, in turn leading to mandatory use of heat recovery devices, more energy-efficient environmental control systems, and tighter control of pollutant emissions. But, contractors with an eye to the future could do well to take a fresh look at ventilation.

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VENTILATION — PRODUCTS & IDEAS

■ Centrifugal force

Compact centrifugal duct fans from Vectaire have been designed to ventilate bathrooms, toilets and kitchens, and are suitable for situations where ducting to an outside wall is required.

Ease of installation is a design feature, the grille having four-way fixing to enable the fan's rear outlet to be mated to 4in. diameter or flat ducting in the most convenient position. Fans can be installed in walls, ceilings, windows or sealed unit double glazing.



Three sizes are available, with and without timers, with and without humidistats, and a two-speed unit can also be supplied with and without a humidistat.

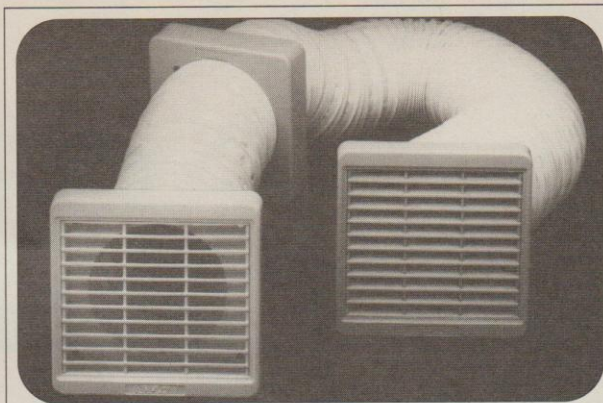
Details. Circle readerlink 129

■ Kitted out

Two interchangeable pvc ducting systems, designed to reduce the overall cost of fitting a ventilation system, have been launched by ADM. Low on initial component price, they are claimed to be very easy to cut, and offer push-fit assembly which may be made permanent with pvc cement or tape.

Quicktube 100 is a 100mm circular ducting, providing a comprehensive kit of tube and fittings for whole-house ventilation. Squareduct 100 is designed to provide surface-mounted ducting, wherever concealment is difficult or undesirable. It may be fitted, for instance, along the top of a wall, giving a clean edge between wall and ceiling. An obvious application would be for high-rise flat projects.

Details. Circle readerlink 133



■ Hitting the small time

The Mini Loovent and the Mini Duct Fan are two recent additions to Airflow's established range of Loovent domestic fans. The Mini Loovent has been designed for the ventilation of small rooms such as bathrooms and W.C.'s and is suitable for either wall, ceiling or window mounting. It can be specified with either a pull cord operation or with an integral timer, which can be activated via a door or a light switch.

The Mini Duct Fan (see pic) has been designed for installation in situations which require flexible ducting or where a particularly low noise level is necessary. It contains an assembled fan, a white inlet grille, a grey outlet grille and two metres of flexible ducting, with fixing clips.

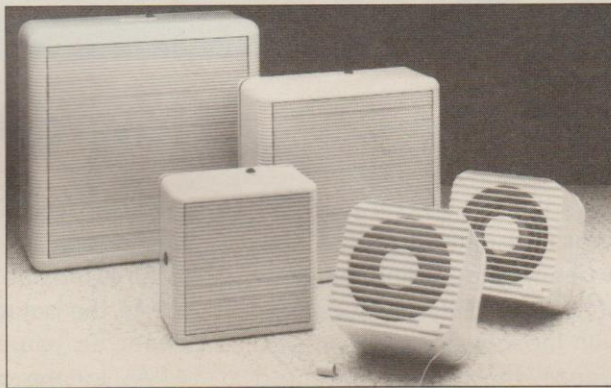
Details. Circle readerlink 135

■ Studio line

The Studio range of domestic fans from Specialised Air Movement Equipment (below) includes fans which can be wall or window-mounted with universal fittings and the 9in. and 12in. automatic versions are also fully reversible.

The complete Studio range covers fans from 4in. to 12in. impeller diameters with duties from 95m³/hr to 1400m³/hr. Options include run-on timers, pull cord operation and automatic shutters while the RNV variable speed controller provides precise adjustment of fan performance.

Details. Circle readerlink 130



■ Window boxes

Window mounted units are now available from Fujitru, in addition to the company's range of floor standing, wall and ceiling mounted and ceiling cassette air conditioners.

A choice of seven models is offered, some cooling only, while others provide cooling and heating with electric heating or reverse cycle heating systems. Output across the range starts at 7,200 Btu through to 27,000 Btu. Other features include automatic airflow adjustment, indoor/outdoor air exchange providing fresh air to the room and dehumidification.

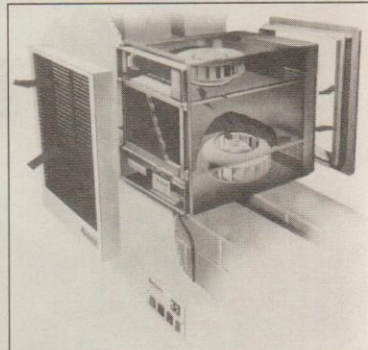
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■ Getting the balance right

Ventilation specialist Lidiard and Skelton has announced its acquisition of the Reclaire balanced ventilation system. The system overcomes the disadvantages inherent in conventional extraction fans, by providing a unit that introduces fresh air into a room at the same rate as stale air is extracted.

The Reclaire ventilator is claimed to be able to eliminate the problems of draughts and 'dead areas' which can occur with extraction only based systems. Another useful benefit is energy saving, as its integral heat exchanger removes up to 70% of heat from the exhaust air stream to pre-heat the incoming air.

Details. Circle readerlink 132



Balancing act: the Reclaire system.

■ Easy for first timers

A console heat pump system, Hi-Line, introduces air conditioning to installers with no specialist refrigeration knowledge.

Launched by Environheat and based on the company's Elite range, the rear carriage of the unit is simply slotted into a special sleeve built into an outside wall, then connected to the power supply.

The Hi-Line offers back-up electrical heating, and there are three model sizes available with a choice of 3kW to 4kW output, three fan speeds and individual controls.

Standard features include an inbuilt changeover thermostat and defrost control and it comes complete with sleeve and external grille for easy installation.

Details. Circle readerlink 134

Airflow Developments

ABF range

4 pages

● This brochure from Airflow Developments includes full details and photographs of the five fans in the ABF range, which are designed for smaller commercial applications.

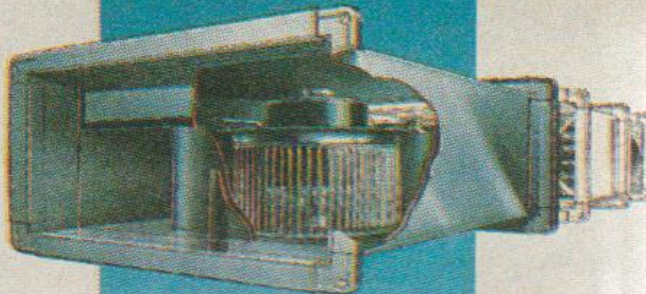
Data curves showing the performance of the units when installed with rectangular and circular ducting (with and without filter) are included along with their nominal flow rates.

AIRFLOW

ADVANCED MANUFACTURING TECHNOLOGY

The new ABF range

The shape
of fans to come...



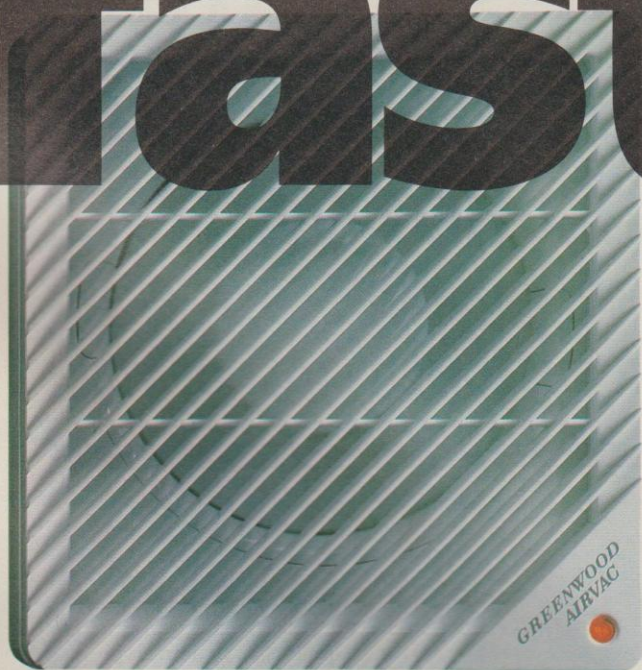
...as part of
an integrated ducted
ventilation system.

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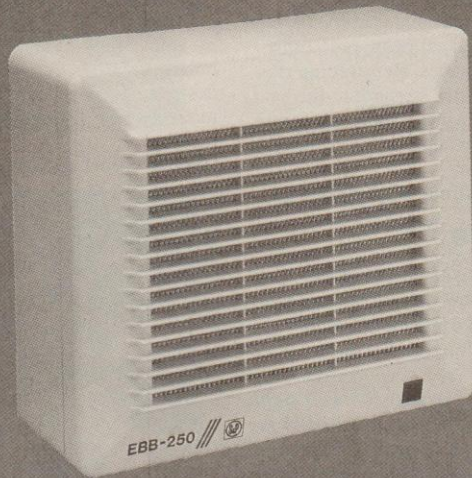
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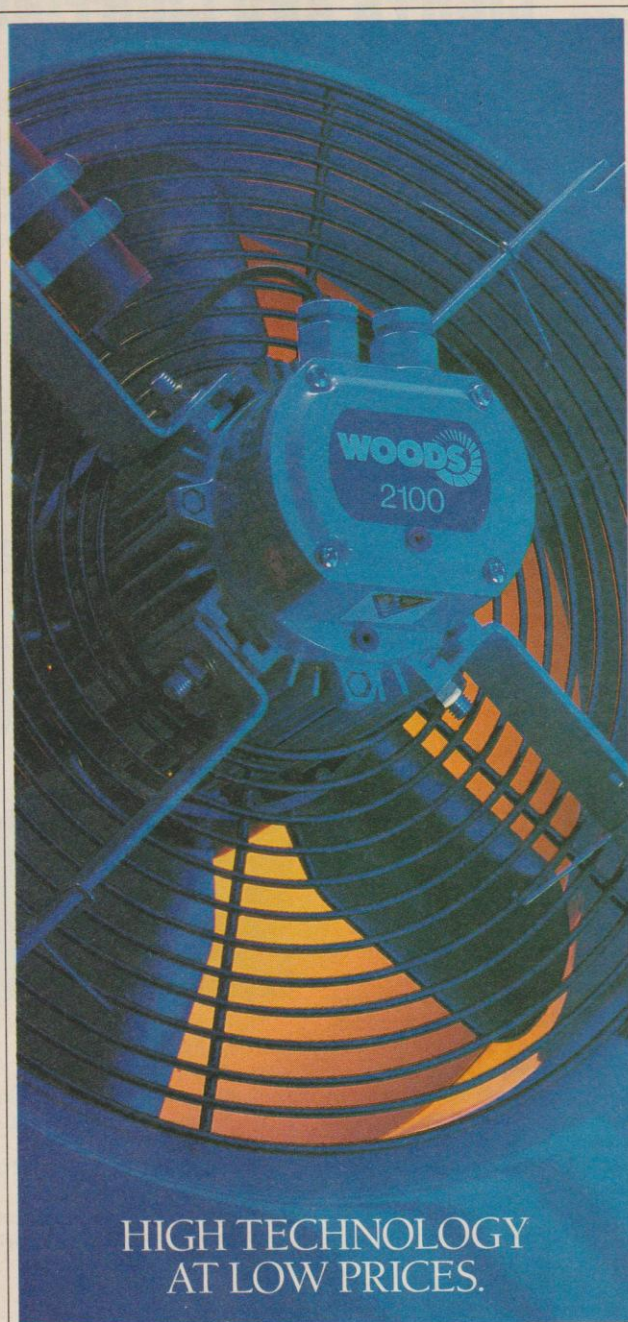
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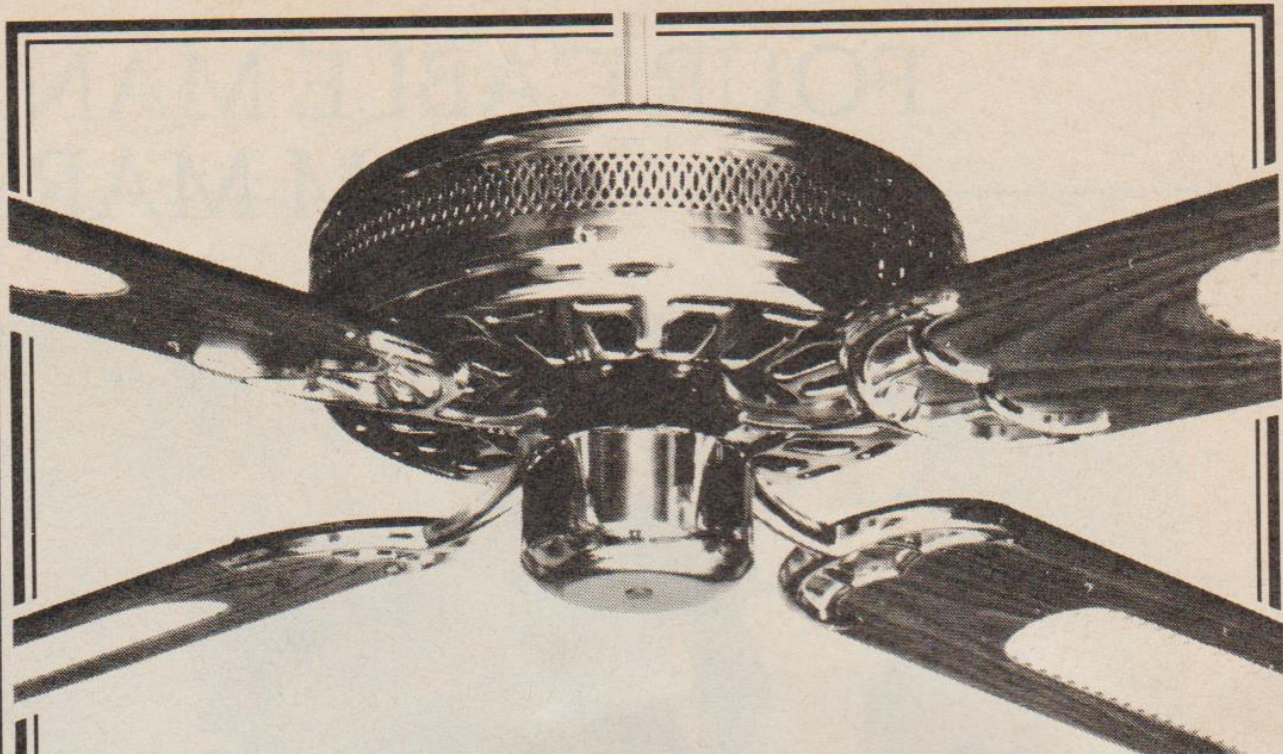
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