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# Incorporating adequate ventilation into a building

by John Stephenson

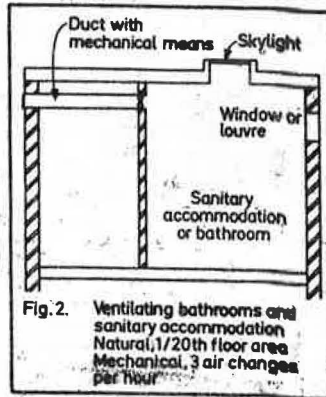
*This article takes a brief look at the attitude of building regulations to ventilation. There is no definition of ventilation within the regulations, but the ordinary dictionary meaning is the process of replacement of vitiated air by fresh air.*

**F**resh air is vital to our good state of health, and the necessity for ventilation of dwellings and other buildings has always existed. The means adopted and the amount of air changes considered necessary have varied through the ages.

Our primitive forbears relied upon a hole in the roof to let the smoke out, whereas today we tend to seal ourselves into our homes and offices. This may be acceptable with sophisticated heating systems, but can create unpleasant and possibly dangerous conditions when reliance for warmth is placed on open fires and unvented appliances burning oil or gas.

It is clear from quickly perusing the regulations and the associated approved documents that there are many facets to the introduction of adequate ventilation into a building.

For example, if one is constructing a suspended timber floor next to the ground, the ground is to be covered with a layer of concrete to resist moisture, but also to prevent ground air rising and entering the building. This must be supplemented by having a ventilated space under the timber at least 75 mm from the underside of any wallplate and 125 mm to the underside of the suspended floor. There are to be ventilation openings in the exter-



nal walls and through any adjoining solid floors to ensure a free flow of air below the timber floor. Particular care is necessary to ensure that pockets of stagnant air cannot form in corners. (See Fig. 1)

Part F of the regulations is devoted to ventilation. There is to be means of ventilation to ensure an adequate air supply for people in a building but the requirement only applies to:

- dwellings
- buildings which contain dwellings
- rooms containing sanitary conveniences, and
- bathrooms.

Satisfactory ventilation by natural means will be achieved if ventilation openings meet the following requirements:

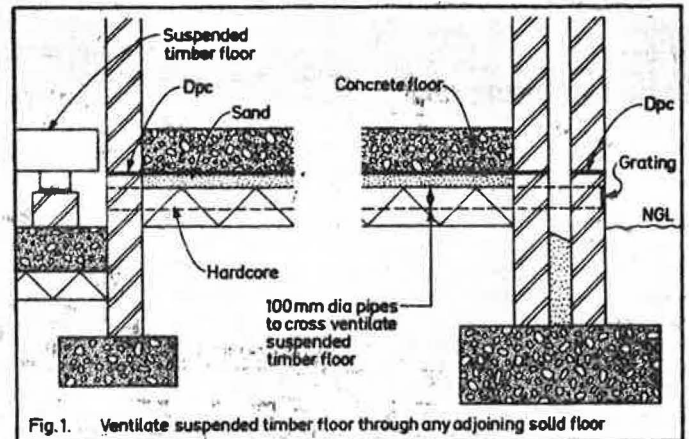


Fig. 1. Ventilate suspended timber floor through any adjoining solid floor

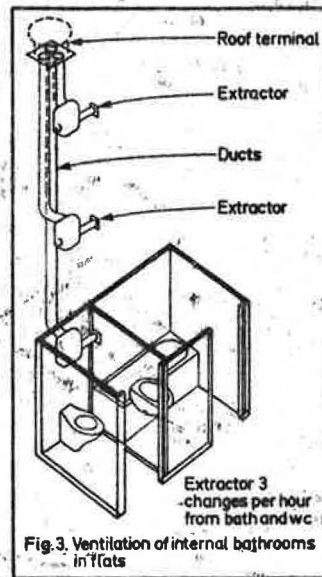


Fig. 3. Ventilation of internal bathrooms in flats

● Habitable rooms, kitchens and bathrooms in dwellings are to have ventilation openings or other openings equal to at least 1/20th the floor area. Some part of the opening must be not less than 1.75 m above floor level.

● Common space in buildings containing dwellings must have one or more ventilation openings having a total area not less than 1/20th floor area of the space.

● Sanitary accommodation in any building is to have one or more openings having a total area not less than 1/20th the floor area. (See Fig. 2)

All the requirements of F1 may be achieved by resorting to mechanical ventilation, in which case the rate of air change must be as shown in table 1.

For ventilation of a food store or a space provided for a food store we must look to Part G of the requirements, and find that when natural ventilation is provided, and there is only one opening there must be an openable area not less than 300 mm by 300 mm covered by a durable fly screen.

When there is more than one opening provided each is to have an openable area not less than 70 mm by 70 mm.

Mechanical ventilation may be used, and any ducts used for either natural or mechanical ventilation must be not less than 125 mm by 125 mm and have a smooth surface. (See Fig. 4)

There are also provisions enabling a room to be ventilated through a conservatory or similar space, comparable to the requirements in the 1976 regulations.

## Much concern about condensation in roofs

Condensation in roofs has been giving rise to much concern and provision for ventilation of the roof space is also provided for in Part F. Probably one fifth of air ventilated from a house, will find its way up through the roof space and it is therefore essential to prevent large volumes of warm moist air collecting in unheated roof voids. Much can be prevented by sealing around pipes and ceiling hatches, but reasonable precautions must be made to obviate excessive condensation in the roof void by providing adequate ventilation.

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Room or space	No. of air changes per hour
Habitable rooms in dwellings	1
Kitchens in dwellings	3
Bathrooms in dwellings	3
Common spaces in buildings containing dwellings	1
Sanitary accommodation in any building	3

\* Mechanical ventilation for bathrooms may be intermittent in which event it should operate for not less than 15 minutes after use of the room stops.  
 \*\* Mechanical ventilation may be intermittent operating for 15 minutes after use of room stops.

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Cross ventilation of pitched and flat roof space is provided by having ventilation at eaves level. Area of the openings is to be the equivalent of a continuous gap running the full length of the eaves 10 mm wide for pitched and 25 mm wide for flat roofs. Single slope roofs must be provided with ventilation at the eaves and also at a high level. (See Figs. 5 & 6)

## Heaters make great demand for ventilation

Heating appliances make a great demand for ventilation and a room or space containing a solid fuel or oil burning appliance with a rated output up to 45 kW must have an air supply as follows:

### Open solid fuel appliances

Ventilation via a permanent air

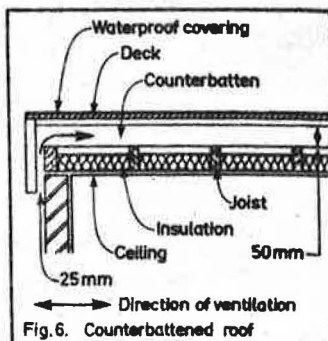


Fig. 6. Counterbattened roof

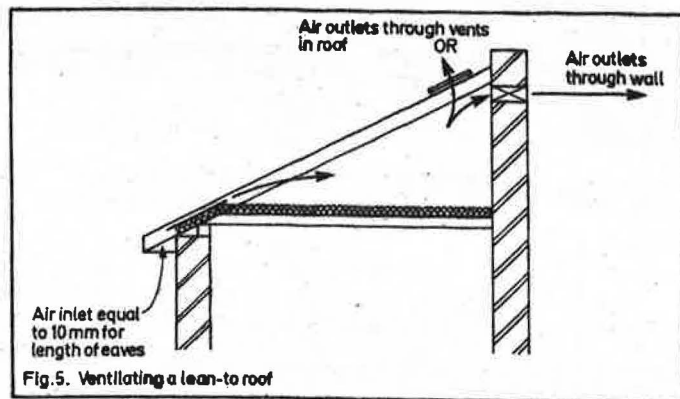


Fig. 5. Ventilating a lean-to roof

opening having a total free area not less than 5,500 mm<sup>2</sup> or 50 per cent of the appliance throat opening, whichever is the greater.

### Other solid fuel appliances

Ventilation by a permanent air opening with a free area not less than the combined areas of the primary and secondary air inlets to the appliance.

### Oil burning appliances

May be ventilated by a permanent air opening with a total free area not less than 550 mm<sup>2</sup> per kW of the rated output.

An extract fan should not be fitted in a room unless the heating appliance is room sealed.

There are also provisions for introducing air into rooms containing gas appliances rated up to 60 kW.

### Cooker

The room must be not less than 6 m<sup>3</sup>, have an opening to the outside air, which may be a window, and also have a permanent opening of 6500 mm<sup>2</sup>, or 3500 mm<sup>2</sup> where the room has a volume between 9 m<sup>3</sup> and 11 m<sup>3</sup>.

### Balanced flue appliance

No ventilation requirement.

### Open flued appliance

Permanent ventilation to the outside air is required as follows.

1. decorative appliances require an area of 1800 mm<sup>2</sup> for each kW rated put above 2 kW, or

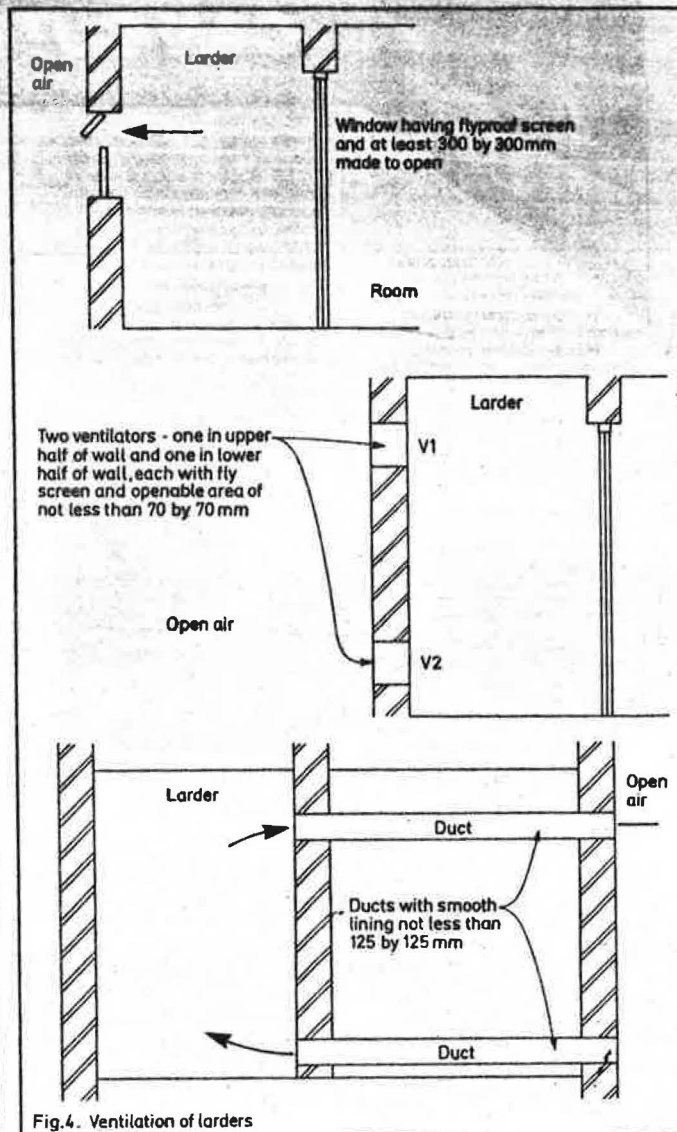


Fig. 4. Ventilation of larders

2. any other open flued appliance must have an area of 450 mm<sup>2</sup> for each rated kW rated put above 7 kW, or alternatively the appliance can be installed in accordance with BS 5440: Pt 2: 1976 - air supply for gas appliances.

### Washbasin

32 mm pipe should not be more than 1.7 m long. 40 mm pipe should not be more than 3 m long.

### Bath

40 mm pipe should not be more than 3 m long. 50 mm pipe should not be more than 4 m long.

Branch ventilating pipes must be connected to the discharge pipe within 300 mm of the trap, run direct to the outside air, and terminate at least 900 mm above any openings into the building.

Soil and vent pipes should also be provided with an air outlet to the complete drainage system, although in some circumstances an unvented stub stack may be permissible.

Cesspools, septic tanks and settlement tanks are also required to be ventilated to ensure that foul and explosive gases may escape freely and harmlessly into the open air. □

## Drainage and waste disposal

Part H of the regulations is devoted to drainage and waste disposal, and it is necessary to provide for adequate ventilation to secure efficient functioning of sanitary pipework and drainage.

Pipework is to be designed in order to prevent water seals being broken by pressure which can develop and the length of waste pipes should not exceed the following.

### Sink waste

40 mm pipe should not be more than 3 m long. 50 mm pipe should not be more than 4 m long.

## cement and mortar stain remover

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