

Managing draughts and ventilation



How much heat am I losing through draughts?

You do need some ventilation but if your home is well insulated then draughts can be a large part of your heat loss. Ideally you want the right level of controlled ventilation, not a lot of uncontrolled draughts. The only way to be sure is to have your house tested for air tightness – but this is only worth doing once you have dealt with most of your draughts.

How much fresh air do I need?

You need fresh air in your house for a lot of reasons – but the main one is normally to control moisture. Moisture comes from people breathing, showering and bathing, cooking and doing the laundry. This means kitchens and bathrooms need more ventilation than other places.

Moisture can lead to condensation and mould, also it encourages mites which trigger allergies. You get condensation when moist air cools to below its dew point. At 70% humidity the dew point is 14C - below this you will get moisture. This happens most often on cold surfaces such as windows.

Building regulations specifying trickle vents around windows and extractors for bathrooms and kitchens are intended to keep the humidity below 70%.

How do I find my draughts?

You can watch the smoke from a joss stick or other smoke generator, or feel for them using the back of your hand. You need to look between floorboards and under skirting boards, around windows and doors. Also look at places where pipes go through floors and ceilings. Don't forget the loft hatch and any pipes going into the loft.

It is easier to feel cold air coming in than warm air going out but which way it goes depends on the direction of the wind, so look on cold breezy days when the wind is coming from different directions.

How do I fix them?

For doors and window seals you need a draught strip. There are different shapes of strip for different size gaps:



E for small gaps and P for bigger ones. The strip contains foam which squashes down to make a good seal with the surface. For sliding surfaces like sash windows or the bottom of doors you can use a brush strip.

For small gaps between floor boards and under

skirting boards you may get away with just a sealant. For larger gaps you will need a filler too. This can be papier-mache made from newspaper but caulking strip is easier to use. There are lots of different products and demonstration videos on youtube.

For chimneys, you must allow some ventilation through because otherwise if rain gets into the chimney it will stay wet. However, you can block off most of the chimney with plastic bags filled with newspaper or get a chimney balloon.

Will I get condensation if I fix the draughts?

If you fix all your draughts and don't have enough ventilation then you will get condensation and mould. You are especially likely to get moisture in areas where surfaces are cold and air does not flow freely, such as

- on window sills, especially if you have heavy blinds preventing air flow or metal framed windows without a thermal break or single glazed windows
- bathroom ceilings, especially if not well insulated above and you don't have an effective extractor fan
- behind the sofa if it is close to the wall, especially if the wall is not insulated or if there is cold coming from below

What are my ventilation options?

You have a wide range of options with a wide range of costs.

- Opening the windows (see shock ventilation below)
- Fixed vents, such as trickle vents around windows
- Extractors in kitchens and bathrooms, on timers or with a humidity sensor
- Whole house ducted ventilation
 - using natural convection or with a mechanical fan to force air flow,
 - with or without a heat exchanger
 - fixed rate or with a humidity sensor

Opening the windows (and shock ventilation)

If you wait until the room is stuffy before opening the window the air may be unhealthily moist before you notice a problem. Even if you do, in winter you may not want to leave a window open all the time and you might prefer to be stuffy and warm than well ventilated and cold. This is not ideal.

The other problem with opening windows is that you can't control the direction of air flow. When the air is moist, for example after you have been cooking or showering, you want the steam to go out of the house rather than into the other rooms. Merely opening the window allows flow either way.

None the less, you can ventilate your home just by opening the windows, if you take the trouble. In Germany this is called 'Stoß-Lüften' (shock ventilation). You have to open all your windows and internal doors just for a few minutes (5 minutes at the most), several times a day. Opening everything gives you a good through draught so as to change the air thoroughly. However, you only lose the small amount of heat that is in the air; the walls, floors, furniture etc don't have time to cool down.

Fixed vents such as trickle vents around windows



Fixed ventilation systems such as trickle vents are designed to give you enough ventilation most of the time which means inevitably you get more than enough. However this is only a problem if your house is well insulated and the vents are your main heat loss. Also in steamy areas like kitchens and bathrooms they may be inadequate and they don't control the direction of flow.

Extractors in bathrooms and kitchens

You need extra ventilation in bathrooms and kitchens or places you dry clothes. An extractor will make sure that the moist air leaves the building rather than going into the other rooms.

Extractor fans are rated according to the airflow they will generate and a bathroom fan should be at least

15l/s. If your bathroom is 2.5m x 2.0m x 2.2m, its volume is 11000 l so this rate would give you a complete change of air in 12 minutes. In practice some of the steam will hide in corners but running the fan for 15 minutes should clear the air adequately.

It is important to allow air into the room to replace the air being extracted. Opening a window next to the extractor won't work well because the airflow will bypass most of the room. You need to bring air in from opposite the extractor, which usually means the bathroom door. You can put in a vent but if there is a 10mm gap underneath it that will be sufficient. However, if the door is too airtight the extractor will struggle, and that applies to the rest of the house too: the more air tight your house is the less effective the extractors.

You can have your extractor switched on by a cord and turn off automatically after a given time, or you can get one which turns on automatically triggered by humidity or a presence/motion sensor. The latter has the advantage it is easy to tell if it is working since you know it should come on when you enter. Also humidity is not the only reason why you might want ventilation in a bathroom. (I have not yet heard of an odour activated fan.)

Whole house ducted systems

Most new homes are built with MVHR – mechanical ventilation with heat recovery. This is a whole house ducted ventilation system with a mechanical pump driving the airflow between rooms and a heat exchanger to reduce heat loss. Each kitchen or bathroom has an extract and the other rooms have vents for fresh air to flow in. The heat exchanger takes heat from the extracts and uses it to warm the fresh air coming in – it should be able to reduce heat loss by 90% or more.

MVHR can sometimes be retrofitted into existing houses though it is expensive. Also it has running costs: power to drive the pump (though much less than the saved heat loss) and replacement filters.

You can also have mechanical ventilation without the heat recovery, which requires less power. It can be triggered by humidity, to minimise heat loss.

It is also possible to use only natural convection, though this is usually very difficult to fit into existing houses. You need bigger ducts, with as few bends as possible so that the air flows easily under minimum pressure.

For more information go to <http://www.transitioncambridge.org/energy> and look for the [Ventilation FAQ](#).

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