

# Ventilation Assessment

## 123 Example Street, AB1 2CD

### WE WANT FRESH AIR, NOT DRAUGHTS

Every home is different, but all humans require fresh air 24 hours a day. For good health, guaranteed ventilation must be provided throughout the year. We know that ‘natural ventilation’, relying upon a constant wind blowing across a building, does not work well enough to do this.

We improve energy efficiency by removing draughts from gaps around doors & windows, through ceilings lights and loft hatches or between floorboards. But we must also have controlled ventilation to bring fresh air inside, and to take stale, moist air from cooking, washing and other daily activities, outside.

Most homes in the UK are under-ventilated, with many people believing that ‘a little bit of mould doesn’t do any harm’. But condensation, damp and mould can lead to respiratory problems, so children, older people and those with lung issues are particularly at risk. But Ventilation is key to good health for us all, as noted in the following links:

<https://www.nice.org.uk/guidance/ng149/resources/indoor-air-quality-at-home-pdf-66141788215237>

[https://www.rcpch.ac.uk/sites/default/files/2020-01/the-inside-story-report\\_january-2020.pdf](https://www.rcpch.ac.uk/sites/default/files/2020-01/the-inside-story-report_january-2020.pdf)

<https://www.youtube.com/watch?v=aBWIXLMnqBk>

### CURRENT PROVISION

Survey measurements were taken for Internal Air Quality, giving valuable insight on the existing ventilation in your home. The property is occupied full-time by two adults, so allowances must be borne in mind for full occupancy and the greater requirements for ventilation.

Current Building Regulations advise the following limits:

	1 Month	1 Week	1 Day
Internal Relative Humidity	65%	75%	85%

The survey results, using calibrated measuring devices, were as follows:

SPACE	parts per million carbon dioxide (normal 400-800)	percent relative humidity (normal 35-60)
Bed 1	922	74.7
Bed 1 ensuite	1015	76.3
Bed 2	668	58.1
Main bathroom	670	59.1
Bed 3	644	57.2
Kitchen	1042	68.9
Living / Dining area	943	66.8
Study	1072	67.1
Utility	987	67.7



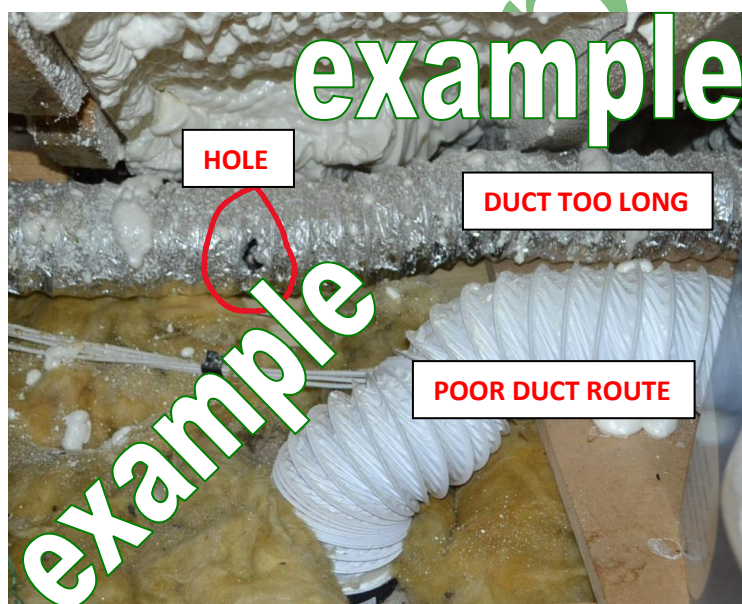
The results indicate underventilation, and guide us to a need for improvement. When there are more people in the building even higher levels of humidity and carbon dioxide would occur, although stuffy, unhealthy conditions should be really obvious at that point.

Extract ventilation is provided by fans in the following rooms, with results measured using a calibrated device and compared with Building Regulations Part F 2021:

Space	Extraction litres / second	Building Regulations litres / second
WC	5.00	6
1 <sup>st</sup> floor bathroom	no fan	15
Bed 1 ensuite	3.33	15
Utility	8.33	30
Kitchen	33.40	30
<b>Minimum total whole dwelling ventilation required, according to floor area and number of bedrooms (Building Regulations Part F)</b>	<b>Provision</b> 50.06	<b>Required</b> 53

Extract fans need to work, be kept clean and clear of dust, be energy efficient and be so quiet that they do not disturb sleep and working concentration. These factors are key for good ventilation. Ventilation ductwork should be of rigid, smooth-walled, circular-section material, with 'swept bends' – using two 45 degree bends to turn a right-angle corner instead of a single 90 degree bend. Flexible duct should be installed at 'full stretch' and no longer than 300mm.

Loft ductwork is in need of attention, with a hole in the aluminium duct, sending warm, moist air into the loft space. This increases the risk of damp and material deterioration to the timber rafters, which should be kept at 12-15% moisture content (maximum), with rot starting to develop at 20%.





- 1.1 Background ventilation is needed in all rooms, without which the following arise:
  - the risk of overheating
  - the risk of excess moisture, leading to condensation & mould
- 1.2 All internal doors will need gaps next to the floor, to ensure a good cross-flow of fresh air through your home.
- 1.3 Due to the presence of openable windows in all habitable rooms, purge ventilation is generally believed to be good but was not measured.
- 1.4 For a full overheating survey and assessment, the actual opening areas of all relevant windows would be measured and put together with other information to summarise the risk of overheating. Initially this is a straightforward exercise but it can involve detailed calculations and is not a part of this report. External shading (either manually operated or motorised) is the best way to prevent overheating from direct solar radiation.
- 1.5 **Based upon these measurements and observations, it is the Author's conclusion that the house is significantly underventilated and that improved ventilation should be introduced at the earliest opportunity.**

## 2 ADVISORY PROVISION

- 2.1 A new ventilation system should be installed, before any other insulation or draught-proofing measures (including new windows & doors, loft or wall insulation, etc):
  - change the extract fans in rooms as previously discussed on site, blocking up the resultant wall holes using matching construction materials as necessary
  - consult the replacement ventilation system supplier before removing the kitchen cooker hood fan (there may be a way to keep this in the same place)
  - install the new ventilation system, again as discussed on site
  - an alternative could be to install a Mechanical Ventilation system with Heat Recovery, but MVHR costs significantly more and extensive ductwork would be required.
- 2.2 Humidity controlled vents will likely be part of the new system.
- 2.1 Depending upon the fan choice and areas served, fans extract stale air from all of the wet rooms at the same time, with fresh air entering via humidity-controlled window or wall vents
- 2.2 Whole house ventilation should be enabled by having suitable, minimum 7,600mm<sup>2</sup> gaps under every internal door between rooms (**Fire Doors require specific treatment**).
- 2.3 A suitable grille-type vent in the door leaf of at least 7,600mm<sup>2</sup> could be an acceptable alternative (**Fire Doors require specific treatment**).

## 3 NOTES ON VENTILATION CRITERIA

- 3.1 Requirements for ventilation were updated in the new Part F of the Building Regulations which was introduced in June 2022. Ventilation must be installed by a competent person. Even though one could choose to only follow the Building Regulations advice for existing buildings, nevertheless it is the Retrofit Coordinator's responsibility to treat occupant health as Top Priority, so the ventilation regulations for new buildings are followed as far as practically possible. The general criteria for healthy ventilation are:



### **Extract Ventilation**

This is required to remove water vapour from rooms where water vapour or pollutants are typically present. Wet rooms need a fan extracting EITHER intermittently OR continuously. The total for all continuous extraction should at least equal the Whole Dwelling Ventilation rate.

### **Whole Dwelling Ventilation**

This is required to provide fresh air to dilute, disperse and remove water vapour and pollutants not removed by extract ventilation. It can be provided by continuous extract fans or by background ventilators. The whole dwelling ventilation rate to be supplied to all habitable rooms is determined by total floor area and number of bedrooms. There should be a minimum of five vents in each home (four vents in one-bed homes).

Internal doors should have gaps equivalent to 7,600mm<sup>2</sup> beneath them (typical 760mm wide doorway to have 10mm gap). Fire Doors are life-saving devices, so ventilation gaps for Fire Doors should be treated in accordance EITHER with advice from a Fire Consultant OR with advice from the door manufacturer.

### **Purge Ventilation**

This is required for each habitable room (a room used for dwelling purposes but which is not solely a kitchen, utility room, bathroom, cellar or sanitary accommodation) to remove high concentrations of pollutants and water vapour. Hinged or pivot windows opening to less than 15 degrees are not suitable for purge ventilation.

### **Noise**

Noise from mechanical ventilation systems should not exceed:

- 30dB LAeq,T for noise-sensitive rooms when a continuous mechanical ventilation system is running on its minimum low rate
- 45dB LAeq,T in less noise-sensitive rooms when a continuous operation system is running at the minimum high rate or an intermittent operation system is running

<END>

Example Only