



The Green Deal

Avoiding Indoor Air Quality Problems
Associated With Fabric Improvements

How to avoid degradation of building
fabric and health issues caused by
inadequate ventilation

A BEAMA Green Deal Ventilation Guide

Introduction

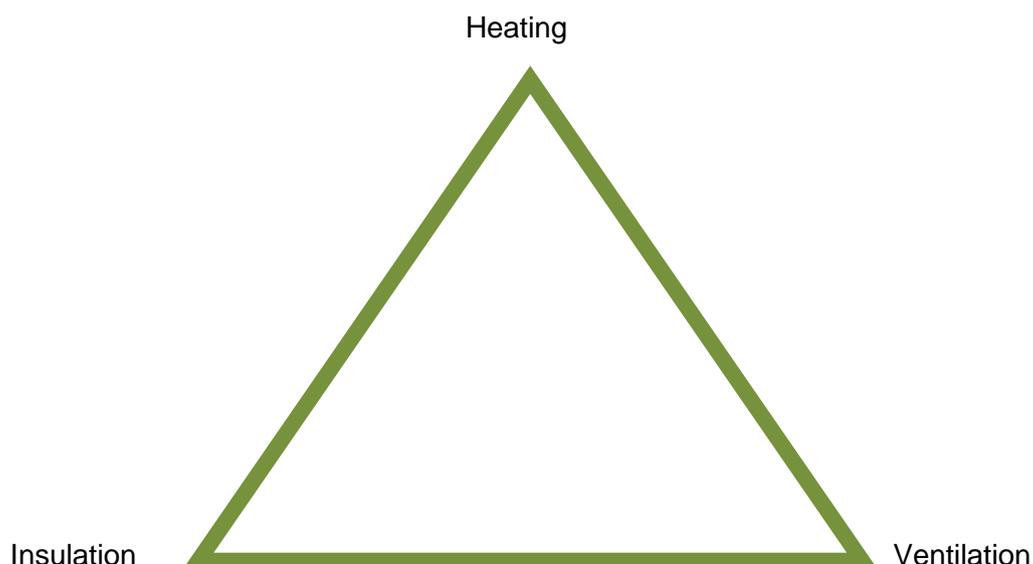
The Royal Institute of Chartered Surveyors state that 1 in 5 UK homes are affected by condensation and mould growth. There are many factors that contribute to this; such as, poor thermal performance of the building fabric, inadequate heating, lifestyles of the occupants and inadequate ventilation.

Green Deal gives an opportunity to address these issues but can as equally exacerbate them without understanding and minimising the risks. Critically, it is important when specifying a package of fabric measures to ensure a holistic building specification approach is taken.

The overall objective when re-furbishing buildings is to create an ideal balance between heating, insulation and ventilation.

The recommended approach to a balanced refurbishment involving internal or external insulation improvements is to specify continuous ventilation at low cost and low risk.

The Balanced Environment



Where a package of improvements is proposed to be installed under a Green Deal Plan it is the responsibility of the Green Deal Provider to ensure that the products installed are properly integrated with each other and with any previously installed energy efficiency improvements in order to –

(a) ensure that the energy performance of the products and the improved building will be broadly as anticipated by the savings estimate made by the Green Deal Provider in respect of the Green Deal Plan;

(b) minimise the risk of damage to the building fabric as a consequence of –

(i) inconsistent or discontinuous insulation (thermal bridging); or

(ii) inadequate ventilation or inadequate air tightness, particularly where the installed measures include internal or external solid wall insulation systems, cavity wall insulation or replacement or secondary glazing; and

(c) minimise any risks to the health and safety of occupiers.

Full guidance can be found in the Department of Energy And Climate Change document – Green Deal Code of Practice.

<http://www.decc.gov.uk/assets/decc/11/tackling-climate-change/green-deal/6533-green-deal-code-of-practice.pdf>

The Risks and Issues

Heating and ventilation without insulation can lead to high running costs for the occupants. Cold surfaces will attract moisture to them; such as, single glazed windows.



Heating and insulation with poor ventilation can result in higher internal humidities. The picture below shows a recently insulated solid wall. The picture was taken in July when humidity is reasonably low. Moisture can clearly be seen to be forming on the cold bridges caused by the plaster dabs behind the insulation.



In time this moisture will allow mould spores to cultivate causing damage to the building fabric and creating a risk to the health of the occupants (see below).



Higher internal humidities can result in larger House Dust Mite populations.

Both the detritus from house dust mites and mould spores are potent airborne allergens. Exposure to high concentrations of these allergens over a prolonged period will cause sensitisation of atopic individuals (those with a predetermined genetic tendency to sensitisation), and may sensitise non-atopic individuals. Once a person is sensitised relatively low concentrations of the airborne allergen can trigger allergic symptoms such as rhinitis, conjunctivitis, eczema, cough and wheeze. For a sensitised person, repeated exposure can lead to asthma, and it appears that the severity of the Asthma intensifies with increasing humidity, house dust mite and mould levels.

Allergens associated with house dust mites (found in the mite faecal pellets) are the most common triggers of asthma, and are also implicated as a causal agent of the illness. Around 80% of atopic children who suffer from asthma are sensitised to house dust mites, and about a third of all children, whether asthmatic or not, display some evidence of allergy to them.

Although less significant statistically in health terms, spores of many moulds and fungi (including timber attacking fungi) can be allergenic. The spores can also be carcinogenic, toxic and cause infections; the potential health effect varying with species.

Fungal infection, whilst not common, is usually associated with those vulnerable to infection (such as those on immuno-suppressant drugs). Some fungi, particularly when in very high concentrations, can also colonise the airways of susceptible individuals, particularly asthmatics. Toxins from some moulds (mycotoxins) can cause nausea and diarrhoea, can suppress the immune system, and have been implicated in cancers.

Although uncommon, these are serious if they occur.

What a Green Package should assure

The minimum requirement is that there should be no visible sign of mould on external walls in a properly heated home with typical moisture production.



Great care should be taken when insulating to ensure that consistent thermal performance is achieved. Even small variations in surface temperature can result in mould growth. The pictures below illustrate what can occur.



Loft insulation has been installed



The cavity has been filled



The gap between the roof and ceiling was omitted

Installing internal wall insulation without adequate ventilation can result in interstitial condensation. In the following example no ventilation was present in the dwelling. Mould growth is abundant and the moisture has resulted in the insulated boards becoming delaminated from the solid stone walls.



Recommendations – Avoiding or reducing the risk

It is not always reasonably practical for the guidance given in Approved Document F of the Building Regulations to be employed when improvements are made to an existing dwelling. For example existing windows may have trickle ventilators fitted with less than the required equivalent area. Systems such as Whole House Mechanical Extract Ventilation and Whole House Mechanical Ventilation with Heat Recovery may be difficult to install due to excessive duct runs. The Green Deal Assessor needs to determine what the situation is and how to ensure adequate ventilation. The specification should be achieving 7 litres per second/per person with a whole building ventilation rate not less than 0.5 air changes per hour. The solution is one of 3 means of continuous ventilation; each best suited to specific existing circumstances in the dwelling.

The following methods are easier to install into existing dwelling.

- *Decentralised Mechanical Extract Ventilation – Continuous running extract fans*

These products are best suited where existing through the wall intermittent extract fans are present as these can provide like for like replacement.



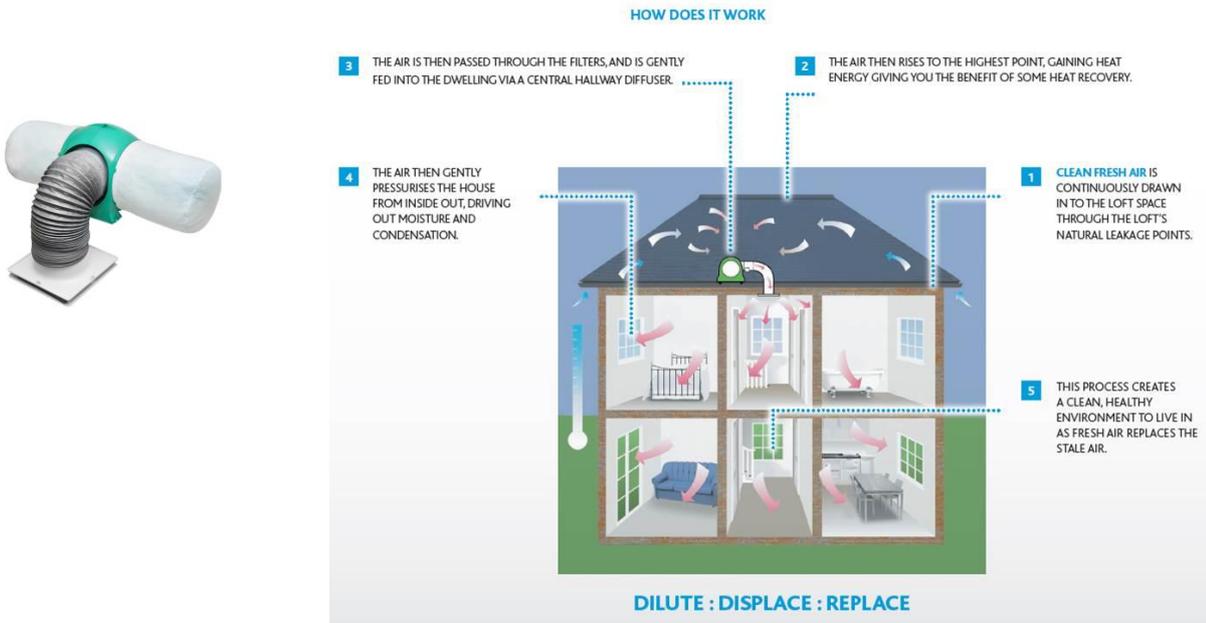
- *Single Room Heat Recovery*

These products are similarly best suited where existing through the wall intermittent extract fans are present as these can provide like for like replacement. They offer the additional benefit of providing heat to the room. These products can only be installed directly onto an external wall. Special attention should be taken in relation to wall thicknesses, especially when additional insulation is added to walls where the unit is intended to be mounted.



- *Positive Input Ventilation*

If a loft is present, Positive Input Ventilation is a simple solution, with supply via a central duct, typically located in the dwelling hallway. Some pre-heat can be supplied via the loft space with a by-pass available for summer months.



Where To Find Out More

Green Deal Providers are recommended to visit the BEAMA website www.beama.org.uk to find a ventilation manufacturer. All BEAMA ventilation members supply relevant continuous ventilation products and are well positioned to offer specification advice.