

Reducing Condensation in Residential Units

This online resource paper provides information about water condensation in domestic settings and how it can be reduced through good design

Definition and Overview

Condensation within a property occurs because water vapour in the air deposits itself on surfaces that are at lower temperatures. People create moisture in a dwelling through a wide range of regular activities, for example through boiling kettles, cooking, and taking showers. Even the breathing of occupants contributes to this moisture level.

Internal condensation issues often occur because of too much water vapour in the air (known as humidity) within a room of little to no air circulation. Low internal room temperatures can also create cold surfaces (particularly on windows and exterior walls) which allows warm, moisture filled air to condense onto them easily.

Key Points to Consider

Adopted Local Plan Policy ENV3: Good Design includes several criteria to help prevent condensation occurring in a dwelling or reduce its severity. For example, criterion (a) advises that development proposals should be based on a proper understanding of elements such as microclimate and natural light. Criterion (t) encourages sustainability in design, including ensuring resilience to a changing climate. The reduction in a development's energy use also promoted in this criterion relates in part to the provision of adequate ventilation in a dwelling, which in turn can help to reduce condensation build up (see following paragraphs).

In the medium to long-term, condensation may cause mould, damp patches on walls, and paint to peel off the edges of the property's windows. A build-up of moisture in the property can potentially damage the fabric of the building if it is allowed to continue. If mould starts to grow, this can even affect the health of the occupants. Within a residence, there are three basic methods to control the problem of condensation:

- Controlling humidity within the dwelling;
- Providing ventilation or ensuring there is adequate ventilation in the dwelling;
- Adding insulation within the property.

Condensation is rarely a problem in England during the summer. With warmer air outside, windows and doors are open more often, so more ventilation then ensures humidity cannot build up as easily inside the house. Warmer air circulating also means surfaces inside the property are usually not cold and it is more difficult for condensation to then occur.

Conversely in winter, windows and doors are not open often because of colder temperatures outside, so ventilation rates are lower and water vapour in the air inside homes is hence higher. In addition, particularly if the home is not heated well, cold surfaces inside can provide an outlet for water vapour to condense.

Opening doors and windows in winter has limited potential to reduce the possibility of condensation. Ventilation rates are improved, but the air coming into the property is cold, and the circulation of cooler air cannot solve the problem of cold internal surfaces. In addition, there is the obvious problem of heat loss from the home, which can also make internal surfaces colder than if the dwelling's openings were closed.

There are a wide range of research and analysis documents available which investigate the resistance to moisture of typical constructions, in both new buildings, and where insulation is retrofitted to existing buildings:

www.gov.uk/government/publications/resistance-to-moisture-in-buildings.

Practical Dwelling Design and Operation Measures to Reduce Condensation

The validation requirements of Craven District Council promote the provision of Sustainable Design and Construction Statements (SDCS) with development applications - see the Council's validation webpages and Appendix C of Good Design SPD.

Elements such as double glazing, insulation, energy efficient boilers, appropriate heating controls, and ventilation systems can be included in SDCS to help evidence the sustainable design and construction for a home as part of the efficiency and reduction of energy use. These elements also can act to reduce or prevent condensation build-up in a dwelling, and how they play this role is discussed in the following paragraphs.

Install Double Glazing, Loft and Wall Insulation

Double glazing of windows, loft insulation and draft proofing of walls will all work to reduce the amount of heat that is lost from a property. Installing insulation will help to keep the temperature of the surfaces inside the property at a higher level, thus reducing the probability of condensation. Design and construction of the dwelling in this regard will also improve the energy efficiency of the property.

However, relationships between insulation, condensation and damp can be complicated. If condensation is found in one place in the home, it may be that this is an uninsulated part of the dwelling when every other part is insulated. For example, a wall may be insulated, but single window glazing exists. Small insulation gaps at the top of a wall tend to attract condensation. Insulation is also not the solution to an existing damp problem in a dwelling.

Ensure the dwelling has adequate heating

Related to the above, ensuring an adequate amount of heating in the home will improve the internal temperature of the dwelling's surfaces, and hence reduce damp conditions and the likelihood of condensation. This is particularly important in winter months, as in addition to keeping residents warm, internal heating can prevent condensation appearing on otherwise colder surfaces.

Of course, leaving heating on constantly just to avoid damp is not sensible, as much larger amounts of energy would be used and it is very expensive. Hence, having an energy efficient boiler and appropriate heating controls represent a very good starting point to maintain a comfortable and dry dwelling.

Install a Whole House Ventilation System

Whole-house ventilation is the use of one or more fans and duct systems to exhaust stale air and/or supply fresh air to the house. It can better control the exchange of indoor air with outdoor air. A whole house ventilation system can be installed in a typical home. Adequate ventilation is essential to allow the moisture to escape from a property before it turns into condensation, so even installing one energy-efficient extractor fan can be effective.

There are two types of main ventilation systems that are defined by the way in which they manage air flow through a building:

- Positive Input Ventilation (PIV) systems work by drawing air into a building from outside. This subtly increases the air pressure in the building and forces the air to move around between different rooms before escaping;
- Mechanical Extract Ventilation with Heat Recovery (MVHR) works in the opposite way to PIV. The building's moist air is taken out through a central system of extractor fans connected to various rooms and is replaced with fresh clean air filtered as it enters.

Relevant Craven Local plan policies and guidance

- Policies **ENV3: Good Design**

March 2023. This webpage provides general information about relevant planning topics and we hope you find it helpful. Please be aware that it is not a statement of Council policy and does not provide formal policy guidance. For those things, please refer to the Craven Local Plan and supplementary planning documents.