



Dwelling Moisture Management

Important information you should review for the success of your home ventilation system for moisture reduction.



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1. **The Healthy & Comfortable Triangle** - Three groups of items make a home more healthy and comfortable: effective heating; effective insulation; effective moisture reduction. Items from within any of these groups cannot effectively perform the task of anything in the other two groups – they act independently and together with each other.
2. **With positive pressure ventilation systems, the air starts from outside of the home and must flow freely into the roof space** - For effective positive ventilation systems for moisture reduction utilising the normally drier air from the roof space, there must be a free flow of air from outside of the home into the roof space to replace the air drawn into the rooms below on a continuous basis – building paper located beneath the roof material normally prevents the air flowing into the roof in sufficient quantities to allow ventilation systems to be successful. This is easily rectified by placing a simple air grille into the soffit or eaves, one per room outlet, to allow air to flow into the roof space.
3. **The air in the roof space when a ventilation system is running is essentially the same as the air outside** - With Unovent® systems, while drawing air into the rooms, the air in the roof space completely changes every 10 to 30 minutes with fresh outside air. This means that we are bringing the drier outside air into the house via the roof space, lagging behind, whatever the condition of the outside air is, by 10 to 30 minutes – this is the reason why the unique Unovent® h-line™ option can successfully reduce moisture by bringing air into rooms without a roof space above them directly from outside through the external walls – basically, the roof of a house, from a positive pressure ventilation system perspective, simply eliminates the rain drops. (All other conditions of roof space air, when the ventilation system is running and drawing air from the roof space, are identical to those outside. When no air is being drawn from the roof space, the air in the roof will have a much higher

temperature than the outside air, only to become near equal after the ventilation system re-starts the flow of the air from outside through the roof space into the rooms below.)

4. **Ventilation systems cannot continuously and effectively heat or cool houses but they should be switched off when the roof air or outside air is unsuitable** - The Unobrain® sensor/controller, which is placed in the roof cavity (for ceiling mounted Unovent® v-line™ room outlets) or under the soffit or ceiling of an entrance porch (for wall mounted Unovent® h-line™ room outlets), has one and one only task to perform – it decides if the air in the roof space or outside is suitable to bring into the living spaces. It has no part to play in determining what is comfortable in the house – that is the domain of an effective heating system in the winter and whatever strategy is employed for cooling in the summer (such as the cooling function of a heat pump or opening windows).

5. **Fully automated control stops unsuitable air (too hot or too cold) being brought into the house** - For the summer, with a rising temperature of the roof air, the Unobrain® switches the system off when the temperature of the roof air reaches 28 degrees C – it will probably be about 24 degrees C in the house at the time. For the winter, with a falling temperature of the roof air, the Unobrain® switches the system off when the temperature of the roof air reaches 8 degrees C – it will probably be about 12 degrees C in the house at the time if no heating was being employed and considerably higher than that if heating was being employed.

6. **When it is raining for a prolonged period, the air in the roof or outside should not be brought into the rooms** - The Unobrain® sensor/controller also determines if the in the roof or outside is too moist to be useful as a moisture reduction resource. For any time, when we have prolonged periods of rain, the air outside and in the roof space is too moist to be useful.

The Unobrain® switches the system off when the relative humidity reaches 85% – it is likely that the relative humidity in the roof space will quickly rise from about 75% when it starts raining to the high 90's % within about 15 to 60 minutes and, therefore, we are able to detect rain periods and unsuitable air for moisture reduction with a fixed setpoint of 85%. As a moisture controlling system, we are not concerned about other times when, say, the relative humidity is just above 60% – that is a result of mother nature when the air in the roof, outside and in the house are all going to be at a similar relative humidity. These levels of relative humidity change slowly at those times whereas they change quickly when it starts raining.

7. **Unsuitable air in the roof or outside has the same parameters in all parts of New Zealand or world-wide -** Unacceptable conditions for the air in the roof space or outside are repeatable from one end of New Zealand to the other and nothing to do with the conditions inside the house. They occur at different times of day due to different weather patterns and outside air temperatures from one end of New Zealand to the other. These are the reasons why the Unobrain® was designed to be install-and-forget with no requirement for user adjustment.
8. **Most moisture inside a home is generated by the inhabitants and not so much because of the weather -** The bulk of the moisture in the home air, which we are all attempting to reduce, comes from the inhabitants breathing. This is not surprising given that we are made of about 50% to 75% water. The water escaping from our bodies by breathing and other activities is in the range 1 to 2 litres per day. We do need to reduce moisture in the home air mainly because it is food for black mould. On the other hand, typical weather patterns, with different intensities throughout the country, create effects inside homes which add to the issue but do correct themselves providing we take a medium to long term view of how moisture reduction can be effective. As a typical explanation (there are exceptions), when we get rainy

periods and the Unovent® system has switched off due to unsuitable moist air in the roof space or outside, the temperature is not freezing cold and our coming and going from the house lets some moisture laden air into the home. Because of the relatively higher temperature of the windows, we do not always see any show of moisture during this rainy period. Usually the rainy period in the winter is followed by a cold snap or spike and on the first morning with glass temperatures lower, we expect to see a “dusting” of moisture on some of the windows. Typically, this is gone by mid-morning if the Unovent® system has switched back on. The next morning, we expect to see less of a dusting of moisture on windows, if not none, and this, if any, is gone by an earlier time in the morning. What should not be happening throughout these weather pattern changes in the winter is the running water down windows, but we should expect the occasional “dusting” of moisture gone by mid-morning.

9. **Room outlets in bedrooms should not be placed just inside the doorway** - Unovent® room outlets are placed, for example, in bedrooms in any of the three corners other than the corner where the door is located. These placement positions for Unovent® room outlets provide an effective clearance of the wet or “bad” air from the room at a lower air flow rate than what is required for ducted ventilation systems where the vents are typically placed in the corner where the door is located.
10. **Systems with room outlets only in the hall are an old design idea and, in most situations, not so effective** - Many years ago, some suppliers of home ventilation systems provided a single outlet for placement in the hall near the bedroom doors. The theory was that the drier air would pass into the bedrooms to flush them out. This would typically only be successful if (1) windows in the bedroom allowed air to leak out past them, or (2) windows were left open and (3) the bedroom doors were left open. When none of these things happened, the systems were not so successful – often because the outlet units were too noisy

and people shut the bedroom doors. Today the trend is for individual room outlets in each bedroom.

11. **Air management systems have varying degrees of air movement sound** - The Unovent® room outlets are identical to each other, other than some physical differences between the ceiling mounted Unovent® v-line™ option and the wall mounted Unovent® h-line™ option. The sound level measured at the unit in a sound laboratory is 14 dB(A) (decibels) which is described in Google as "whisper" or "barely audible". With background noise during the day, it is generally impossible to hear sound generated by the Unovent® outlets. In the middle of the night it is possible to pick up this low-level sound which is to be expected, given that it is an air movement device. Typically, the Unovent® outlet sound level is less than is picked up from some outlets in a ducted ventilation system.

12. **An additional check list of do's and don't's for home moisture reduction** - A key rule in moisture reduction in homes is *rooms where moisture is produced rapidly should have that moist air removed rapidly*. Such rooms include the kitchen, laundry and bathroom. In the kitchen, a rangehood and/or an extraction fan to exhaust the air to the outside of the house is always a necessity. In the laundry, if clothes are dried in the room or in a clothes dryer which is not ducted to the outside of the house, an extraction fan is required to exhaust the damp air outside of the house. In the bathroom, an existing extraction fan will exhaust the air outside of the house or, better still, a [Showerdome®](#) should be fitted to the shower which will retain the moisture within the shower enclosure and prevent the unwanted moist air being deposited in the bathroom. No extraction fans should exhaust air into the roof space and, if they are, the moist air passed into the roof space will be brought back into the living spaces by the home ventilation system for moisture reduction.

13. **Old style downlights need modification or replacing with energy saving LED ceiling light fittings** - Old style down lights using incandescent lamps have large air gaps up into the roof space for cooling air to pass. They also let valuable heated air escape from the rooms below and they allow air to pass from the rooms into the roof space then back down into the rooms through the home ventilation system for moisture reduction. This air passing from room to roof to room, and so on, simply distributes the produced moisture throughout the house and roof space. Combined with the issue mentioned in item 2, with a sealed roof space, no moisture is removed and even more distributed throughout the house and roof space. A cure for this is to fit a [Cosydome®](#) or similar approved cover over each downlight which restricts air flow into the roof space. An alternative approach is to replace the incandescent downlight fittings with LED downlights which do not have the air path into the roof space.

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