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# UNDERSTANDING CONDENSATION

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# Understanding Condensation

## Introduction

During the colder months of the year, there is a greater temperature difference between the inside of a house and the outside weather. The glass on the windows and doors tends to reach lower temperatures than other surfaces of the house, which makes it the first place that people notice condensation in their homes. Condensation does not occur due to defective windows or doors, it's just an indication of excess humidity in the house. If not controlled, the excess of moisture can have serious consequences, such as:

- Mould or mildew
- Wood rot and warping
- Roof ice build-up
- Damp, ineffective insulation
- Discoloured, blistered or bubbling paint
- Damaging moisture inside walls and attic

Excessive humidity is prone to occur in newer or freshly remodelled homes with tight, energy efficient constructions that don't "breathe", inducing an increase of moisture to the interior.

We have created this guide to answer questions regarding condensation, indoor humidity and exterior condensation. Let's start with the basics and suggest solutions and alternatives to help you along the way.

Should you require further assistance, please contact us.



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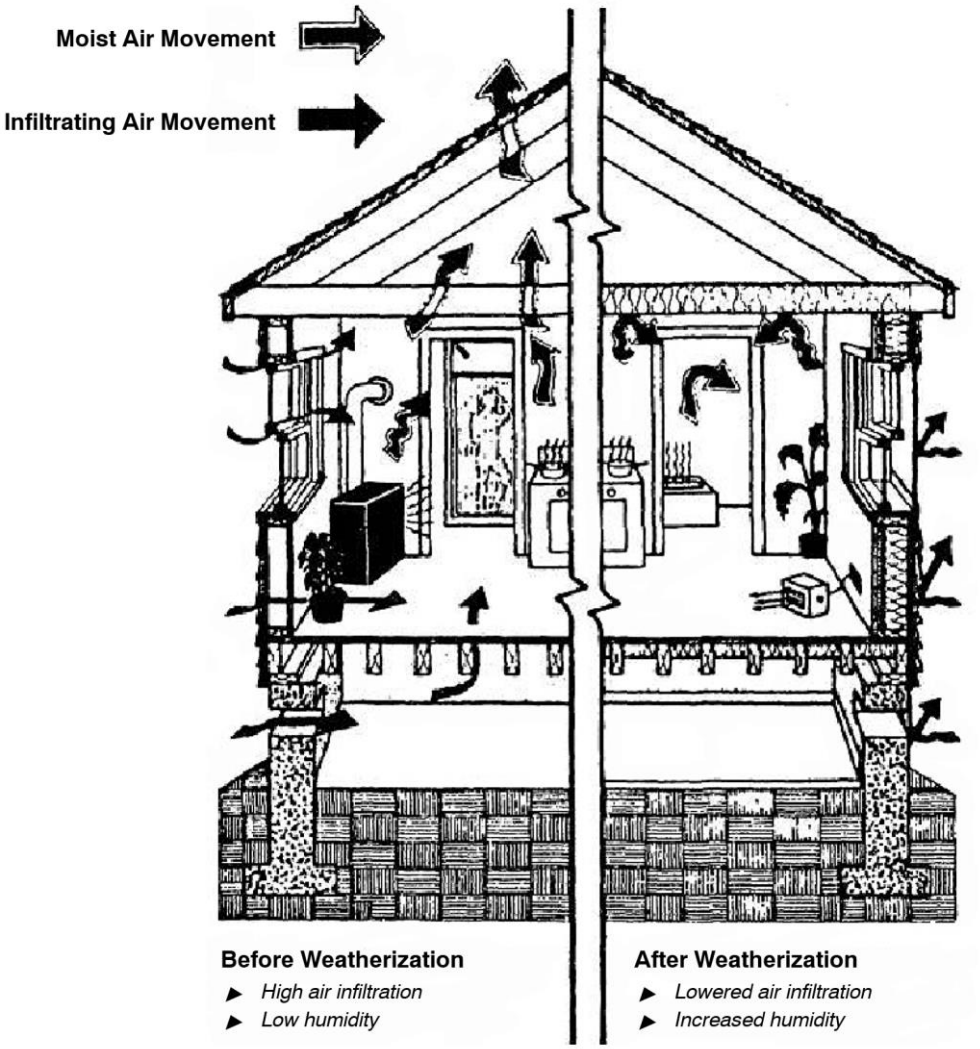
# What is condensation and what causes it?

Moisture present on the windows is a form of condensation. It comes from water vapour in the air and can appear on the interior or exterior of the window glass.

Condensation on windows and other cool surfaces in the home can both be annoying and possibly injurious to your home. Because the most often visible condensation is seen on windows, it is easy to blame condensation as being a window fault. This is not true in most cases. Any cool surface will cause excess humidity to condense on it. If there is condensation on windows, it can be a warning sign that excessive indoor humidity is also condensing on walls. This is more serious since that can penetrate the walls and cause internal problems.

The cause of condensation is air saturated with too much humidity or water. When this happens, air cannot hold the excess humidity. It gets rid of it by condensing it on the most convenient cool surface.

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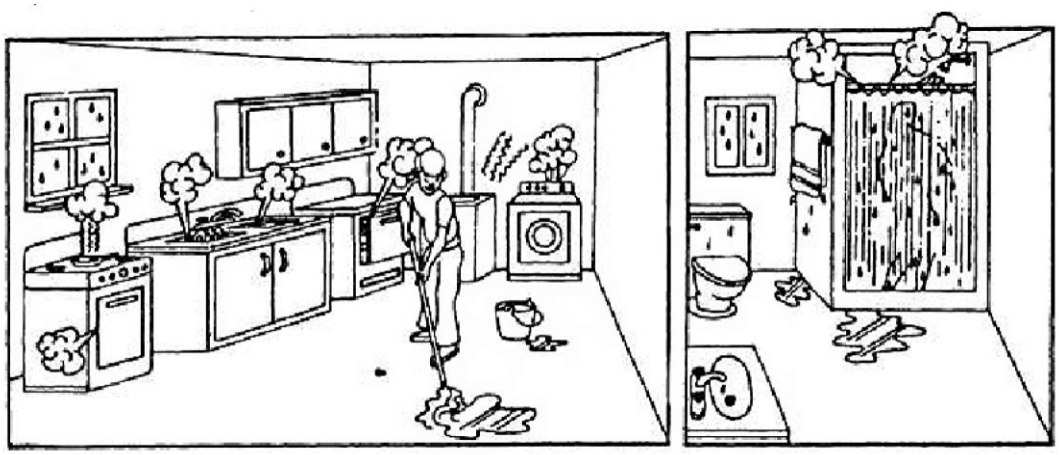
# What is humidity and where does it come from?

Humidity is water vapour, or moisture, suspended in the air. Usually it cannot be seeing, but in the form of steam or fog, enough has condensed to be visible. Humidity is always present in the air, visible or invisible.

There are many situations that generate humidity, such as:

- Clothes dryer vented into the living space.
- Normal breathing and perspiration by a family of four adds a half pint of water to the air each hour.
- Cooking can add up to four or five pints of water per day.
- A shower can add another half pint.
- Dishwashers, washing machines, and dryers can add several pints of water to the air.
- Humidifiers that are adding too much humidity.
- Poorly insulated crawl spaces that allow humidity to invade the home.
- New homes will often emit excess humidity for the normal drying out of the building products. This is normal and will usually adjust itself within a year or less

In other words, if condensation is to be reduced, the source and amount of humidity in the air needs to be determined.



Air can carry only a certain amount of water vapour, which depends on the air temperature. When air holds all the vapour it can support at a determined temperature, it's said to have a relative humidity of 100%. Warmer air holds more moisture than cool or cold air. This means that the amount of moisture in the air has reached its maximum and can't hold any more. Therefore, it gets rid of it by condensing it on the nearest cool or cold surface. As air cools, it can't hold as much moisture and therefore, condensation will appear more quickly.

# So what is the ideal amount of relative humidity?

Based on keeping an indoor temperature of 70°F, it will vary with the outdoor temperature. Devices that measure humidity are called hygrometers. You can use an inexpensive hygrometer from a local hardware shop to find out how much moisture there is in your home. Place the Hygrometer in the house for a few days and register the readings every day. Compare your recordings with the chart below. As outside temperatures fall, the indoor relative humidity level in the house should decrease.

As a guide, the following relationship of maximum recommended humidity levels should help you:

| Outside air temperature | Inside relative humidity |
|---|---|
| -20° F (-29° C) or colder | 15% to 20% maximum |
| -20° F to -10° F (-29° C to -23° C) | 20% maximum |
| -10° F (-23° C) | 25% maximum |
| 0° F (-18° C) | 25% to 30% maximum |
| +10° F (-12° C) | 30% to 35% maximum |
| +20° F to +40° F (-7° C to +4° C) | 35% to 40% maximum |

If your relative humidity is above these levels, you probable will have condensation on any cool surface. Excess humidity advances the deterioration of any home, damaging ceiling and walls. In higher levels, it can also lead to greater degrees of unwanted mould and mildew growth. It can also cause the paint of your windows to peel from the sash and damage the window frame.

Experts state that relative humidity can influence your health. They recommend maintaining inside relative humidity levels between 30% and 50%, which is considered a comfort range. Relative humidity at higher levels than 65% might affect upper respiratory health of people suffering from asthma and allergies. Lower relative humidity levels (below 20%) may cause skin dryness or itching.

## Is Condensation More Prevalent Today Than It Used to Be?

In some cases, this may be true. In older homes, the insulation and weather—stripping and other house tightening factors allowed the house to breathe and exchange drier air with more humid air.

Of course, windows were not so airtight, caused colder air to enter the house, and also caused the surface of the window to be colder. Today, because we are all energy conscious, houses and windows are far more energy efficient. This makes us all more comfortable, but may trap humid air inside the home.

# Excess moisture: Causes and Cures

| CAUSE | CURE |
|---|---|
| **INEFFICIENT WINDOWS WITH EXTREMELY COLD GLASS SURFACES** | Install energy-efficient windows and doors. High-performance windows, such as those made with Low E II coatings with Argon gas, make the most of the sun's heating rays during cold months and maintain a remarkable temperature difference between the indoor and outdoor panes of glass. |
| **INADEQUATE VENTILATION OF WINDOWS** | Keep window coverings open during the day to allow air circulation and make sure patio doors have heat vents beneath them. |
| **MOIST AIR TRAPPED IN ATTIC** | Seal around indoor light fixtures to prevent warm, moist air from rising to the attic. Install soffit vents to prevent attic rot, making sure to keep vents clear of dirt and garden debris. |
| **RADIATOR OR KEROSENE HEAT** | Use dryer sources of heat such as gas or electric furnaces. |
| **COOKING AND DISHWASHING** | Vent stove range hoods and dishwashers to the outside. Cover pots while cooking. |
| **STALE, DAMP AIR** | Install an air-to-air heat exchanger to vent moist air outside. Some air quality systems recover up to 97% of the existing warmth and energy to heat incoming fresh air. |
| **SHOWERS AND BATHS** | Make sure bathroom exhaust fans are vented to the outside and use fans regularly. |

# What is an Energy Efficient Window and Why Will It Help?

Windows, doors, and skylights have become an important part of the energy savings plan. They do not allow cold air to enter around a window, thus cooling the surface. Spacers between glazing in double or triple glazed windows are more energy efficient and do not allow cold air to migrate through them causing the glazing to cool.

Special metallic coatings have been developed (known as Low E or low emissivity) which reflects radiant heat and restricts its flow through glass. During cold weather, it will keep heat inside. In hot weather, it keeps heat outside.

Using energy efficient windows will keep the interior glass surfaces warmer and thus reduce the interior cool surfaces on which moisture can condense. Summary In order to reduce condensation:

- Reduce the amount of moisture in the air as the outside temperature gets colder.
- Make sure your home is properly ventilated.
- Use exhaust fans.
- Use vapour barriers on the earth in your crawl space.
- Use a hygrometer to measure and regulate your humidity level.
- Use energy efficient windows (Installing a storm window in an older home may help.)
- If building a new home, make sure your builder is using only kiln-dried lumber and make sure he places heat vents beneath patio doors.

Remember, there is always a possibility that in very cold, unusual circumstances, you may still have some temporary condensation. But if the humidity level is proper and the home correctly vented, this will be short lived.

## Choose Windows Which Are Certified

Windows, doors and skylights, which are Hallmark, certified by the Window & Door Manufacturers Association have undergone rigorous structural, air, and water infiltration testing. Windows, which are certified by the National Fenestration Rating Council, have undergone intensive evaluation for energy efficiency.

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# So, what do you know?

The obvious answer is to reduce the humidity and decrease the number of cool surfaces in your home.

Your first step is to find what the humidity level in your home is. This will need to be monitored regularly as the temperature outside varies. Here area few things you can do to control humidity:

- Make sure your humidifier is working correctly. Turn it down as the weather becomes colder.
- Vent all appliances and vents to the outside.
- Vent attic and crawl spaces.
- Cover the earth in your crawl space with a vapour barrier.
- Run exhaust fans while cooking or bathing.
- If you have a forced air furnace, make sure your home is properly ventilated by installing a fresh intake.
- Clothes dryer vented into the living space.
- Don't store firewood inside.
- As a temporary solution, you may want to try opening your windows a little each day to allow the exchange of colder drier air with warmer more humid air. This should not affect your energy bill in any substantial manner.
- Install energy efficient windows.

## Do you want to learn more about condensation on windows?

**Contact us today**

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