



Van Isle Windows Guide to Understanding Condensation

Most people's first reaction to moisture that suddenly appears on the interior or exterior of their windows is to assume there has been failure of some kind. As annoying as it may be, this phenomenon occurs naturally, especially when the cooler weather arrives, and is not a sign that your windows or doors have failed. In fact, if this happens on your newly replaced energy efficient windows, it is usually a good indicator that they

are doing their job. **Internal condensation** is an indication that there is excess humidity in the home. **Exterior condensation** is a form of dew similar to what you often find on your car in the morning. These forms of condensation can cause a blocked view, moisture build up on your sills or floor, and in the colder temperatures it can even freeze on the surface of your windows.

If you have **internal condensation** on your windows you may have already noticed other signs that the humidity in your home is higher than normal. The air in the house may seem damp and musty, there may be water stains on the walls or ceiling, your floors may creak more than usual, your pipes may sweat, and mold may be developing. None of these are issues you want to deal with as a homeowner. A good way to avoid the harsh consequences of high humidity inside the home is to invest in a dehumidifier or, if a dehumidifier is not in your budget, ventilate your home or rooms impacted, daily, so that there is an air exchange that will aid in equalizing the humidity levels.

If you have **external condensation** on your windows you will likely be experiencing reduced visibility through the windows on all or portions of the glass. This phenomenon might be occurring on one side of your home, one random window or all the windows in the home.

We have put together this brochure to help answer questions you may have about indoor condensation caused by humidity and exterior condensation. We hope that after reading through the provided information you have a better understanding of these issues and are able to take away some suggestions that may reduce, or even eliminate this problem.



Your Island Window Factory

ABOUT CONDENSATION AND HUMIDITY

The moisture that presents on windows is a form of condensation. It is similar to that which you would find on your car on a cool morning or on the surface of a glass of ice water on a warm summer day. It is excess water vapour that comes from the air as it cools and it can appear on both the interior and exterior of the window.

What causes condensation?

As warm air comes in contact with cooler surfaces, the excess moisture in the air condenses. The reason for this is simply that cooler air cannot hold as much moisture as warm air, so when it comes in contact with a colder surface, it releases some of the excess onto that surface.

What does the condensation on the inside of my windows mean?

Window condensation can be taken as a warning sign that excessive humidity may be doing unseen damage to other parts of your home.

What is humidity?

Humidity is water vapour, or moisture, in the air. An example is steam, or ground fog where enough humidity has condensed to be visible in the air. All air contains a certain amount of moisture, whether its visible or not.

What is relative humidity?

The amount of water vapour that the air can hold depends on the air temperature. When air, at a certain temperature, contains all the vapor it can hold, it is said to have a relative humidity of 100%. Thus, when it holds only half as much water as it can hold, the relative humidity is 50%.

Warmer air can hold more moisture than cooler air. So, air at 0°C and 100% relativity humidity contains less water than air at 21°C and 100% relative humidity.

How do I measure indoor relative humidity?

A humidity reading instrument called a Hygrometer can be used to measure humidity. They are fairly inexpensive at most hardware stores. Most of today's programmable thermostats include controls for humidifiers and dehumidifiers. It is important to note the relative humidity levels quoted by your local weather reports are specific to outdoor humidity and have no bearing on the humidity within the home.

How does excess humidity affect my home?

Excess humidity can contribute to the deterioration of your home. It can be absorbed into the insulation and cause it to freeze, leading to damaged walls and ceilings as it melts in the spring. Excess humidity can also find its way through siding to form blisters under exterior surfaces. However, the most concerning effect is that it can contribute to higher levels of unwanted mold and mildew growth which can lead to adverse health effects.

What are some indicators of excess humidity inside my home?

Condensation on your windows can sometimes be a sign of excessive humidity. Keep an eye out for damp spots on the ceiling, particularly in closets where air circulation is poor, or behind curtains that are kept closed. Also, the air in the house may seem damp and musty, your floors may creak more than usual or your pipes may sweat. Keep a lookout for water on the windows, or water in your basement due to spring run off.

Where does indoor moisture come from?

There are several things that generate moisture in the home. The average family of four adds about half a pint of water to the air every hour. The steam from cooking three meals a day adds several pints a day. Showers, houseplants, dishwashers, doing laundry, fish tanks, and several other daily activities contribute to the moisture level in the air of your home. The average family of four doing normal every day activities can add more than 18 gallons of water per week to the air within the home. All of this moisture contributes to the relative indoor humidity of your home.

How does moisture go through walls?

Due to "vapor pressure", moisture in wet air tries to flow towards dry air. This flow can act independently from air currents. During the winter, the air outside is much less humid than the air in your home. So, the vapour pressure, or equalization process, can force inside moisture through cement, wood, plaster and even brick. There are some products that block the flow of the moisture, such as types of varnish or paint that trap condensation between the inside and outside walls causing rot in the homes wood frame and deterioration of other building materials.

Does condensation only occur in the winter?

Although condensation is most common in the winter it can also occur whenever water vapour in the air comes in contact with a surface temperature lower than the dew point (the temperature at which air becomes saturated and produces dew). As an example, on cold winter days the moisture in the warm, interior, air can condense on the typically colder glass surfaces.

In our climate zone, it is not unheard of to see condensation on the exterior surface of the glass during the spring and fall (and occasionally during hot, humid summer days). If this happens on your newly replaced windows it is usually a good indicator that the windows are doing their job as energy efficient windows.

Does relative humidity have an affect on a person's health?

Experts suggest maintaining an indoor relative humidity of between 30% and 50% to prevent possible issues caused by excessive humidity. According to the WHO (World Health Organization), at levels higher than 65%, upper respiratory illness might occur in people suffering from asthma and allergies. A low humidity level can also create issues. Lower moisture levels (below 20%) may induce dry or itchy skin.

In what geographical areas is condensation most prevalent?

Locations, like Vancouver Island, that have an average January temperature of 2°C, or colder, are prime locations to experience condensation on the windows.

Does the age of the home play a part in the severity of the condensation?

Typically, yes. Before energy efficiency became more of a consideration, homes were not built to be weathertight. Insulation practices and products were more basic and the products used for walls and ceilings were made of more porous materials. As a result, water vapour could pass through the walls more easily. In comparison, today's homes are built much "tighter". Products like windows and doors are now built with the intention of reducing air leakage. Things like weatherstripping, modern insulation, vapour barriers and new construction as a whole now include techniques that can help keep cold air out and lock in moisture. As a result, the moisture created by the daily use of bathrooms, kitchens, laundry, plus the occupants, fish tanks and house plants can result in higher interior relative humidity levels. In some instances, if not managed, this can build up to excessive, even harmful, moisture levels.

FINDING YOUR COMFORT LEVEL WITH INDOOR HUMIDITY

What is the relationship between humidity and comfort?

Your comfort in a room is dependent on a few factors. These include the temperature of the air, the relative humidity, the movement of the air, the temperature of all the surrounding surfaces within the room, and the presence of direct solar radiation. Since indoor humidity is one critical component of comfort, you should carefully consider the indoor humidity conditions in the winter and the summer.

Humidity and winter comfort.

For some people, humidified air makes it easier to breathe so higher humidity levels in a home might mean greater comfort in the winter months. The humid air helps prevent the soft tissues of the nose and throat from drying out and in some cases, it may be needed to achieve good thermal comfort.

Most will find comfort in the winter if they have the indoor relative humidity level between 25% and 50% and the indoor temperature is between 18.5°C and 21°C.

Humidity and summer comfort.

The majority of people have experienced the discomfort associated with high temperatures combined with high humidity. One of the main reasons for using an air conditioner in the summer is to reduce the level of moisture in the air.

The same contributors to winter comfort apply to the summer months. Air temperature, surface temperature, relative humidity, air movement and direct solar radiation all play their part.

Keeping the relative humidity between 30% and 60% and the indoor temperature between 22°C and 27°C will aid in keeping most people comfortable during those summer months.

CONTROLLING INDOOR HUMIDITY

How does indoor humidity affect window condensation?

In most cases the cause of condensation in a home is excessive humidity. As the outside temperature decreases, the window glass temperature also drops. When moist air comes in contact with the cold glass, the moisture condenses and forms water droplets. Knowing when condensation will occur and preventing this from happening depends on the energy efficiency of the window, the relative humidity of the home and the exterior and interior temperature.

Is it necessary to invest in a dehumidifier?

You may notice that your home has higher than normal humidity. Signs of this are visible water stains on the wall or ceiling, your floors may creak more than usual, the house has a musty smell, the air seems damp and the windows may experience high levels of condensation. But, often times you may not be able to notice high humidity levels. A good way to avoid the harsh consequences of high humidity is to invest in a dehumidifier.

A dehumidifier works by removing the moisture from the air, thus lowering the humidity levels in the room. In general, they suck in the warm, moist air with a fan. Then the air passes over cooling coils, and as the air loses heat it loses

the ability to hold moisture, so water is released into a collection bucket, pan, or hose depending on the make of the dehumidifier. The air, now without moisture, is then heated up again and is blown back into the room, warm and dry. Many models of dehumidifiers are equipped with a humidistat, which is different than a thermostat, and allows you to set the level of humidity you would like for the room it is in.

Some rooms in your home will be more likely to require a dehumidifier, such as the washroom or kitchen. These rooms typically are warmer than other rooms in the house and they experience high humidity due to steam from bathing or cooking. Another area of the home that may require a dehumidifier is the bedroom. Typically, a homeowner will close the bedroom door overnight and with each person expelling moisture into the air with every breath, the humidity is trapped and the levels in a bedroom can be much higher causing condensation on the windows.

What if I don't have or can't afford a dehumidifier?

If you notice you have high humidity in your home but you do not have a dehumidifier, an alternative is to provide adequate ventilation in

your home allowing for an air exchange which will help equalize the humidity inside and out.

One way to accomplish this in older homes is to open your windows and doors for 20 minutes at a time to allow for an air exchange. For the most effective ventilation, open windows on opposite sides of the same room to create a cross breeze. In some cases, this may not reach the target areas so you may want to employ the use of fans to move the air around. Stand-up, oscillating, and ceiling fans are all great for circulating the air in your home. Not only will they help to reduce moisture, but they'll also distribute hot air more evenly in the winter, and provide a cooling breeze in summer.

Another way to help with airflow around windows is to open the drapes, blinds and curtains. Opening drapes, blinds and curtains will allow air to circulate against the windows, and this will dry out moisture on the windows and help stop condensation from forming.

In most homes, you will find the minimum mechanical ventilation systems available which are exhaust fans in the kitchen and/or bathroom. That said, more balanced ventilation systems are available to help equalize the humidity within the home.

WINDOWS AND CONDENSATION

Are different types of windows more susceptible to condensation?

Bay and bow windows, which usually protrude from the wall, are more likely to experience condensation compared to other types of windows. These window designs restrict the air circulation in the home, more so than other windows. As they hang away from the insulated house wall, they are usually a few degrees cooler. Ensuring good insulation at the head and below the platform is usually a good idea. Increasing air circulation in the area of the bay or bow by adding a fan will also help reduce condensation.

Do window coverings affect condensation on windows?

Most homes have blinds and or drapes over their windows to create a level of privacy but most people do not realize that these same window coverings also contribute to condensation by reducing the air flow of warm room air over the glass. If you keep your drapes or blinds closed you will increase the amount of condensation that will occur on the windows. Opening them slightly helps reduce or prevent condensation by allowing some air flow.

Why does condensation form on the outside of windows?

The condensation you see on your car windshield, lawns and other surfaces in the morning, called dew, is what can happen on the exterior surface of your windows. This only happens when the exterior temperature of the glass falls below the dew point of the air. If the humidity levels are high, this kind of condensation is more likely to form. This is most commonly going to happen in the spring and fall, when cool nights follow warm days. It usually clears up quickly once the sun warms the air.

Is exterior condensation anything to worry about?

Dew forming on windows is a natural atmospheric phenomenon, and is not a sign that the windows have malfunctioned or are leaking. The truth is, exterior condensation is a sign of higher energy efficiency. It proves the outside pane is insulated from the heat indoors. Depending on where you live or the exposure of the windows, it may occur just a handful of times per season. It is even not unheard of to have one window show

condensation but another right beside it be completely clear. This is due to the fact that there may be different conditions that make one window more likely to manifest the condensation. Some of these are the placement of heaters or vents, a tree creating a shadow, outbuildings blocking wind for a portion of the exposed wall, etc.

Primary causes for temporary condensation.

New Construction: building materials used in new construction and remodeling produce large amounts of moisture as they dry out or cure. This will dissipate as the moisture levels are equalized over the first heating season.

Heating Season: There is a possibility that a home may experience temporary condensation at the onset of the heating season. During the humid summer months, a house can absorb some moisture but after a few weeks of heating, this moisture should dissipate.

Preceding Temperature Shifts: Quick drops in temperature can also create temporary condensation problems during the heating season.

Resources

CMHC - Canada Mortgage and Housing Corporation

[Moisture and Air: A Guide for Understanding and Fixing Interior Moisture Problems in Housing](#)

CMHC - Canada Mortgage and Housing Corporation

[Moisture and Air: Householder's Guide - Problems and Remedies](#)

Government of Canada

[Condensation - What causes condensation?](#)

Government of Canada

[Mould](#)

Clean BC Better Homes

[How do I reduce humidity levels in my Home?](#)

[Why is it important to check and possible upgrade ventilation systems after building envelope upgrades?](#)

BC Hydro - Power Smart

[15 ways to reduce condensation in your home.](#)

Canadian Residential Inspection Services Ltd.

[Measuring Humidity in Your Home - Straight Facts About Humidity](#)

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