

# CONDENSATION

## Questions & Answers



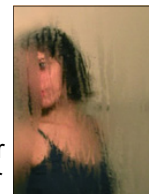
### WHAT IS CONDENSATION?

Condensation is the fog that suddenly appears in cold weather on the glass of windows and sliding doors. It can block out the view, drip on the floor, freeze on glass...it's annoying. It's natural to blame the windows, but you shouldn't.

### WHAT CAUSES WINDOW CONDENSATION?



Window condensation is the result of excess humidity in your home. The glass in your window only provides a cold surface on which humidity can visibly condense. The fog on your windows is a form of condensation; so is the water that forms on the outside of a glass of iced tea in the summer and on the bathroom mirrors and walls after someone takes a hot shower. Condensation usually occurs first on windows because glass surfaces have the lowest temperature of any of the interior surfaces in the house. When the warm moist air comes into contact with the cooler glass surfaces, the moisture condenses.



#### Quick Fact #1

**More water vapor in the air means a higher indoor humidity. High indoor humidity means condensation.**

The important thing is, your foggy windows and sliding doors are trying to tell you to reduce indoor humidity before it causes hidden costly problems elsewhere in your home. Problems like peeling paint, rotting wood, buckling floors, insulation deterioration, mildew, even moisture spots on ceilings and walls.

#### Quick Fact #2

**Foggy windows and sliding doors are the indicators, the warning signs, that humidity could be damaging your home.**

### HOW CAN MY HOME HAVE INDOOR HUMIDITY?

Humidity is a vapor, or moisture, in the air. All air contains a certain amount of moisture, even indoors.



### WHERE DOES THE MOISTURE COME FROM?

There are many things that generate indoor moisture; humidifiers, heating systems, even plants. Cooking three meals a day adds four or five pints of water to the air. Each shower contributes 1/2 pint. In fact, every activity that uses water (like dishwashing, mopping floors, doing laundry, etc.) adds moisture to the air.



### HOW MUCH INDOOR HUMIDITY IS TOO MUCH?

The householder can use the windows as a guide to the proper humidity level with the house. To avoid excessive condensation, the following winter humidities are recommended in the house:

Outside Temp.	Inside Relative Humidity
-20°F	15 to 20%
-10°F	15 to 20%
0°F	20 to 25%
+10°F	25 to 30%
+20°F	30 to 35%

(The indoor humidity can be checked with a sling psychrometer or a humistat.)

In comparison, the Environmental Protection Agency (EPA) states on their website <http://www.epa.gov/mold/preventionandcontrol.html> that ideally, a home's humidity should be between 30 and 50 percent.

#### Quick Fact #3

**It's very simple. If objectionable condensation occurs on the inside surface on the windows, the humidity level in your home is too high.**

## WILL REDUCING THE HUMIDITY IN MY HOME DURING WINTER HELP CONTROL CONDENSATION?

Eliminate the excessive humidity, and you will eliminate most...possibly all...of the condensation.

### HOW CAN I REDUCE THE HUMIDITY IN MY HOME?

- ✓ Control the sources of moisture and increase ventilation.
- ✓ As a temporary solution to an acute problem, open a window in each room for just a few minutes. Opening windows allows the stale, humid air to escape, and fresh dry air to enter. After a shower, for example, open the bathroom window, or turn on the exhaust fan, so steam can go outside instead of remaining in the home.
- ✓ Vent all gas burners, clothes dryers, etc. to the outdoors. Install kitchen and bathroom exhaust fans. If there are a large number of plants in the house during winter, concentrate them in one sunny room and avoid over-watering.
- ✓ Keep basements as dry as possible by waterproofing floors and walls. Run a dehumidifier if necessary. Make sure attic vents are open and unobstructed.
- ✓ Opening the windows slightly throughout the house for a brief time each day will go far toward allowing humid air to escape and drier air to enter. The heat loss will be minimal.
- ✓ Installation of storm windows will often relieve condensation on the prime house windows by keeping the interior glass warmer.



### DOES CONDENSATION OCCUR MORE OFTEN IN PARTICULAR CLIMATES OR PARTICULAR TYPES OF HOMES?

Absolutely! Condensation is more apt to occur in climates where the average January temperature is 35°F or colder because there will be greater extremes between indoor and outdoor temperatures affecting the glass surfaces in the home.



During the first year after construction or remodeling, it is likely a house will have more condensation present because of the massive amount of moisture in the building materials used. Building materials need about one year to dry out, so excessive condensation can be expected in the first heating season. Even after the first year, if the humidity level is too high, condensation may still be a problem because today's homes are much "tighter" (in the interests of energy efficiency) than older homes. New materials and techniques in weatherstripping, insulation, vapor barriers, etc., which are intended to keep out cold air, also lock moisture inside. As a result, moisture created by bathrooms, kitchens, laundries, and occupants no longer flows to the outside, unless mechanically ventilated.

### ARE THERE ANY CASES WHERE WINDOW CONDENSATION IS ONLY TEMPORARY?

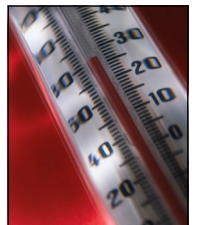
Yes, there are primarily three.

- ✓ New construction or remodeling
- ✓ The beginning of each heating season
- ✓ Quick changes in temperature

Wood, plaster, cement, and other building materials used in new construction and remodeling produce a great deal of moisture. When the heating season begins, there may be a certain amount of temporary condensation. During the humid summer, your house will have absorbed some moisture.



After the first few weeks of heating it will dry out, and you'll have fewer condensation troubles. Sharp, quick drops in temperature can also create temporary condensation problems during the heating season.



#### Quick Fact #4

***During the Summer and Fall, all parts of a house pick up moisture from damp air. In the Fall, when the windows are closed and heat is turned on, this moisture will pass into the air of the house and for a week or two there is likely to be condensation.***



## WHY, IF MY OLD WINDOWS DID NOT HAVE CONDENSATION, DO MY NEW WINDOWS HAVE IT NOW?

One of the reasons you probably replaced your old windows was because they were drafty, and when the wind wasn't blowing in, those slight cracks allowed the excessive humidity within your house to escape to the outdoors. Now that your windows are tight, that excess humidity that is in your house is unable to escape, and therefore, it is showing itself on the glass. Again, this is your first indication that you have too much humidity in your home.

## YOU SAY I SHOULD HAVE LESS HUMIDITY, BUT I HAVE BEEN TOLD THAT MORE HUMIDITY IS HEALTHIER.

At one time, it was believed that humidifiers helped people stay healthy during the winter months. Recent tests have shown that for usually healthy people, this is not the case. In fact, humidifiers may actually cause health problems. Additionally, the Association of Home Appliance Manufacturers makes no medical claims for humidifiers, because an Association spokesman said, "We do not have evidence of medical benefits". However, the Association said "Manufacturers do maintain the humidifiers help plants and furniture only".



## DOES THE AMOUNT OF CONDENSATION DEPEND ON THE TYPE OF WINDOW?

Sometimes. Recessed windows, like bay or bow windows usually experience more condensation than other window styles. This is because air circulation around those window types is usually more restricted, and since they hang away from the insulated house wall, bays & bows could be a few degrees cooler in temperature.



### Quick Fact #5

***Insulate under the seat and head of bay and bow units to reduce excessive condensation. As a secondary measure, place a common electric fan near the window to produce air circulation.***

## DO DRAPES AND WINDOW SHADES CAUSE WINDOW CONDENSATION?

Drapes and other window coverings don't cause window condensation, but they can contribute to the problem by restricting the flow of warm room air over the glass surface. Therefore, condensation is more apt to occur when drapes are closed and shades are pulled down. Today's heavily insulated drapes and tighter shades can contribute to the problem even more.



## WHAT IS REVERSE CONDENSATION?

Condensation that occurs on the exterior (or outdoor) surface of your window or door is generally called "Reverse Condensation". It's also known as "Outdoor" or "Exterior" condensation.

### Quick Fact #6

***In simplest terms, Reverse Condensation is dew. It's the same dew you find on your grass, car windshield, roof and street in the morning. This is a very common natural occurrence and accepted scientific reality.***



## IS REVERSE CONDENSATION A DEFECT OR MALFUNCTION OF MY WINDOW OR DOOR?

No. In fact, it's the total opposite. *Reverse Condensation* on windows is showing you that your windows/doors are doing exactly what they're supposed to do. This signifies that the outside (exterior) pane of your glass is thoroughly insulated from the heat indoors. It certainly does not mean your windows are defective, leaking air or malfunctioning.



## THEN WHY DOES REVERSE CONDENSATION OCCUR?

Scientifically, the right set of atmospheric conditions must take place. Specifically, these conditions are:

- Glass temperature falls below dew point temperature
- Clear night sky
- Still air
- High relative humidity



Mix those 4 atmospheric conditions with well-insulated glass in a window or door unit, and you have all the makings of *Reverse Condensation*. As all of these circumstances come together, the exterior glass surface of your window/door can radiate heat away from itself, allowing the glass temperature to drop below the dew point of the outside air. When this occurs, moisture from the air condenses on the glass surface.

## HOW LONG WILL IT STAY THERE?

Until the glass temperature rises above the dew point. At that point, the condensation i.e. water will evaporate back into the air.

## CAN I DO ANYTHING TO LESSEN OR ELIMINATE EXTERIOR CONDENSATION?

Eliminate? Probably not. Lessen? Possibly.

Although not 100% fool-proof, opening your drapes or shades at night can increase the window's interior temperature a few degrees at night. This may lessen the chance for exterior condensation. You can also try shielding the windows or doors from direct line of sight to the sky using trees or bushes or overhead awnings. But, again, one must realize that this is Mother Nature's work. There is no guaranteed remedy to eliminate it.



## COULD ONE WINDOW HAVE REVERSE CONDENSATION AND ANOTHER NOT HAVE IT?

Yes. Condensation can appear on one side of the house and not another. It's not unusual to see a difference between two windows on the same wall, just a few feet away from each other...one window may have it and the other may not. This happens because of several reasons, such as varying humidity levels, elevation differentials, landscaping near one window but not another, or different rates of exposure to the gradual warming effects of the sun.

## WILL EXTERIOR CONDENSATION HAPPEN YEAR-ROUND?

No. It's usually seen during the spring and fall months when cool nights follow warm days. Areas of the country where outside humidity levels are high will see *Reverse Condensation* more often. You may also see it during hot and humid summer mornings. All in all though, *Reverse Condensation* is rare.



## JUST REMEMBER: WINDOWS DO NOT CAUSE CONDENSATION...

therefore, there cannot be a window which will eliminate condensation. However, certain materials used in the manufacture of windows will be more condensation free than others.

## THE FOLLOWING SOURCES WERE USED:

- \**The Condensation Problem - - Here are the Causes and Cures.* Canadian Builder, Vol. XIII, No. 7.
- \**Condensation Problems in your House: Prevention and Solution.* U.S. Department of Agriculture Forest Service, \*Agriculture Information Bulletin No. 373
- \**Technical Bulletin #1.* Ethyl Corporation
- \**The Condensation Answer Book* and *The Guide To Understanding Condensation.* Andersen.
- \**A Brief Guide to Mold, Moisture, and Your Home* from the Environmental Protection Agency. [www.epa.gov](http://www.epa.gov)
- \* *Understanding Condensation in Your Home.* Simonton
- \* *Window Condensation.* PlyGem
- \* *Service & Maintenance: Condensation.* Pella