WHAT CAUSES CONDENSATION?

Consumer Information Bulletin

Published by **Betterliving**® Patio Rooms

What is condensation?

Windows and doors do not cause condensation. Condensation on windows and doors is the result of excessive humidity inside your home or patio room. The air inside contains water vapor. The warmer the air, the more water vapor it can hold. When this moist warm room air comes in contact with cold glass in a window or door, the air cools and cannot hold as much water vapor. The vapor condenses on the cooler surface of the window or door as water, fog or frost.

A common example of moisture condensation is when a glass of ice water "sweats" when you bring it outside in the summer. When the warm, moist air touches the cold glass, the temperature of the air drops below its dew point, forcing the air to release moisture in the form of water on the sides of the glass.

What causes condensation?

When there is too much condensation on your windows it means the humidity in your home is higher than recommended for the current conditions outside. Condensation depends on two things. One, the amount of moisture being generated and vented within the house; and two, how well insulated your windows are. Just about everything you do in a house generates moisture - laundry, cooking, bathing and even breathing. On clear nights with still, humid air, condensation occurs when moisture-laden air comes in contact with a glass surface that is below the dew-point temperature. (Dew Point is the temperature at which the air will not longer hold its moisture vapor. Cold air holds less moisture vapor than warm air.) The trick is to do whatever you can to reduce this humidity. Condensation usually occurs during the fall when the house is closed up and it turns cold outside.

Other factors that influence condensation are:

- Window Size – larger windows may have a higher tendency to show condensation
- Window Location – Windows protected from the wind will have higher tendency to show condensation
- Screens – Windows protected by exterior screens may have different condensation than the same size windows without screens under the same conditions
- Air Circulation – Good air circulation, such as exposure to wind, reduces the occurrence of condensation. Building projections, foliage and other windbreaks may contribute to condensation.
- Interior Shades – Opening interior shades or blinds may reduce condensation by allowing more heat to transfer to the outside.
- Condensation on windows can be a seasonal or nighttime event, occurring most often during transition months.. When outside temperatures are warm, the glass temperature will usually be above dew point, so condensation will not occur.
- People and pets add humidity - normal breathing and perspiration by a family of four adds a half pint of water to the air in the house
- Cooking can add up to four or five pints of water per day
- Moisture can enter the home from leaks in the roof, walls, surrounding soil, or other uncontrolled leakage
- A shower can add another half-pint.
- Dishwashers, washing machines and dryers can add several pints of water to the air
- Houseplants add moisture to the air, and can also block air flow to the window surface

This in-home humidity enters your patio room when you open the door, and through air leaks in windows and walls between your patio room and your house. You can check this by covering the house wall in your patio room with a plastic sheet and seeing what effect this has on the
condensation.

How much humidity should you have?

The University of Minnesota Engineering Experiment Station suggests the following humidity levels for maximum indoor comfort:

Indoor Air Temperature	Outdoor Air Temperature	Recommended Maximum Humidity
70° F	Below -20° F	15%
70° F	-20° F to -10° F	20%
70° F	-10° F to 0° F	25%
70° F	0° F to 10° F	30%
70° F	10° F to 20° F	35%
70° F	20° F to 40° F	40%

If you're not sure what the humidity is inside your home, ask your HVAC (Heating, Ventilation and Air Conditioning) contractor to measure it for you with a hygrometer. Or, you can purchase a hygrometer at most reliable hardware and home center stores.

How can you reduce humidity?

The most effective way to reduce condensation is to provide adequate ventilation so that humid air can be exchanged for drier outside air. Here are some additional actions that may help reduce excessive humidity levels:

- Open your windows occasionally to vent excess moisture.
- Open drapes and blinds to allow warm house air to circulate against the window.
- Turn off your furnace humidifier or other home humidifiers
- Make sure dehumidifiers are working properly and well drained
- Be sure that louvers in the attic or basement crawl space are open and are of adequate size
- Run ventilating fans in the kitchen and bathrooms longer and more often
- Air out your house by opening a door and window for a few minutes after the bathroom, kitchen or laundry has steamed up.
- Don't store firewood inside
- Move plants away from windows, and run mini-fans during the day.
- 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.
- Vent gas burners and clothes dryers to the outside
- Control or cover other sources of humidity, such as water dishes, fish tanks, large number of plants, etc.
- Open your fireplace damper
- Install a dehumidifier
- Ventilate the crawl space or basement – install foundation vents or leave a basement window cracked in the fall or early winter.
- Ventilate your attic.

Is there any condensation that's temporary?

There are two causes of temporary window condensation, and they normally disappear after a few weeks.
First, there is moisture that comes from new construction or remodeling. There's moisture in new wood, plaster and other building materials. When the heating season starts, this moisture gradually flows into the air of the home. After a few weeks, or at the most, a season of heating, the moisture will disappear.

Second, this same type of moisture can accumulate in a milder form at the beginning of each heating season. During the summer, your house absorbs moisture. After the first few weeks of heating, your home will "dry out" and you'll have less trouble with window condensation.

Why does condensation occur on my windows in the fall, but not in the winter?

During summer, when temperatures are higher, the materials in your home absorb moisture. In the fall, as temperatures drop, materials release this moisture temporarily increasing relative humidity. This in turn leads to condensation on windows and other cold surfaces. Once a new lower moisture balance is reached relative humidity drops and condensation is less likely. Remember that in very cold circumstances you may have condensation in spite of other precautions.