

WINDOW CONDENSATION

Winter heating bills can be enough of a burden for home owners but some people struggle with window condensation as well. There seems to be very little understanding of just what causes this condensation and annually there are many conspiracies traded among neighbors. This time of year can very unkind to Builders and window Salesmen.

Let's look at the basics. Condensation in its basic form is simply the process of changing water vapor back to its original form of liquid. Whenever water vapor touches a cold enough surface it can start to condense out and eventually turn to liquid. We see this happen in many places around the home and at all times of the year. We may have a cold water pipe or a toilet tank sweating in the middle of the summer, or perhaps your favorite beverage.

Anytime we cool a surface by removing heat and then expose that now cooler surface to moist air, we can cause moisture in the air to start sweating on that surface. This is just what happens to our can of pop that we put in the refrigerator. The can of soda starts out at room temperature as we bring it from the store and would not experience any sweating. After a period of time in the fridge the beverage and can become colder than the house air. We bring it back out, place it on the table and it starts to sweat. It's as simple as that.

Let's compare this soda can to your house windows. To start out with we must remember that it's the house air that is trying to keep all the surfaces in your home reasonably warm in the winter. Surfaces lose heat to the outside based on their thermal properties often referred to as R-value. We may have walls with R-values in the range of 19-23, ceilings with R-values in the range of 38-50, but we have windows only in the equivalent R-value range of 3-5. With these much lower thermal values the windows will lose heat faster than any other surface in your home and therefore be the coldest surface your moist house air will come in contact with. Condensation will occur first on the coldest interior surface.

Closing the blinds all but eliminates airflow to the windows. Turning down the thermostat now lowers the temperature of any air that does get to the window but this is all happening while the sun is down and the temperatures outside are also dropping. Between this and the already low thermal properties of all brands of windows it's

almost a sure recipe for some condensation at some point in the heating season.

Windows condensation will generally start at the bottom of any individual window. This could be any style or type of window. Most often we may only have condensation on the bottoms of some of the windows. Why? It's all about replacement energy and airflow. You cannot get airflow to circulate in a square corner such as the bottom of a window set to the outside of the wall. Most folks close their window treatments at night for privacy and turn down the thermostat to save energy. This is typical but most often is the very cause of the window condensation itself.

SUGGESTIONS:

1. Maintain air temperature in the range of **66-70** degrees while being very careful with nighttime setbacks and window treatments.
2. Reduce interior moisture levels according to the outside air temperatures. The colder it gets outside the lower your interior relative humidity (RH) needs to be. You may have to reduce moisture levels to **25-35% RH**, with inside air temps in the range of 66-70, especially when outside air temps get below 30 degrees.
3. Make sure your ventilation system is working so you have the ability to draw down the moisture levels as needed. Get your equipment tested.

Remember; your windows will be the coldest surface in your home and you'll need to be careful. You have to find a balance point which includes your need for privacy, your personal air temperature and moisture settings as well as the moisture necessary to maintain the fine woodwork in your home. These very issues are often in conflict but all have to be considered. In some cases condensation cannot be avoided but can be managed.



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