Window Condensation

What Is Condensation and What Causes It?

Condensation is the little water droplets that you see on a cold drink in the summer or on your car in the morning. It is excess moisture collecting on cooler surfaces from water vapor in the air. If warm air filled to capacity with moisture comes into contact with a cooler surface, the excess moisture that cannot be held in the air will condense onto that surface.

What is Humidity?

Humidity is the name we use for water vapor or moisture in the air. You usually cannot see humidity unless it condenses enough to be seen, like fog or steam. Whether you can see it or not, all air has a certain level of moisture in it. Cold air holds less moisture than warm air. Relative humidity is the term used to describe the percentage of moisture that is currently being held in the air at a specific temperature. If the air contains the full amount of water vapor that it can hold, the air is at a relative humidity of 100%. Keep in mind that the humidity level given in a weather report is for outside humidity. You can measure humidity levels in your home with different measuring instruments such as hygrometers or thermostats.

Bay & Bow Condensation

Bay and bow windows may accumulate more condensation than other window types for a couple of reasons. Interior air circulation is more restricted due to the structure of these windows projecting outward away from the insulated wall, causing them to be cooler in temperature. Also, fully enclosing your bay or bow window with drapes or blinds may lead to a buildup of moisture which, if not controlled, can cause damage to any sealed or non-sealed wood components on the window.

Summer Condensation

As the temperature and humidity levels rise outside, we turn the air conditioner on to make things more comfortable inside. Lowering the temperature inside helps with the relative humidity levels in your home, but it will also lower the temperature of the glass surface of your windows. Summer condensation can occur when the temperature of the glass surface is colder than the outside air temperature/relative humidity (dew point.) We are used to the idea of condensation forming on objects like cold drinks, cars, or grass in the morning. But, not our windows. The only way to reduce the risk of summer condensation is to warm the inside surface of the window, which simultaneously warms the outside surface. You could raise the thermostat setting to achieve this goal. Other options that can help reduce summer condensation are exterior shutters or any form of shade such as trees.

Winter Condensation

We automatically think that because it is cold outside that our windows are safe from condensation. This is not always the case. Winter condensation can occur when the temperature of the glass surface is colder than the inside air temperature/relative humidity. For example, if the outside temperature is 30 degrees, and the inside temperature is 70 degrees with a relative humidity higher than 58%, condensation can occur on a double pane energy efficient window. In comparison, a single pane window with the outside temperature at 30 degrees and the inside temperature at 70 degrees could start to see condensation when the relative humidity is greater than 32%.

In the tables below, you will see some general comparisons of different glass combinations and what relative humidity you would potentially start to see winter condensation form on the glass surface if the outside temperature was 30 degrees, as well as suggested relative humidity levels for a selection of winter temperatures to reduce the risk of having condensation in the colder months.

GLASS TYPE	RELATIVE HUMIDITY FOR POTENTIAL CONDENSATION AT 30°
SINGLE PANE	**32% >**
DOUBLE PANE	**58% >**
TRIPLE PANE	**72% >**

OUTSIDE AIR TEMPERATURE	INSIDE RELATIVE HUMIDITY
-20° F OR BELOW	**≤ 15%**
-20° F TO -10° F	**≤ 20%**
-10° F TO 0° F	**≤ 25%**
0° F TO 10°	**≤ 30%**
10° F TO 20° F	**≤ 35%**
20° F TO 40° F	**≤ 40%**

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Why Do My New Windows Have Condensation?

If you recently replaced your older windows and are now experiencing condensation, you should not be alarmed as this does not mean there is an issue with your windows. In fact it means the opposite. Your older windows may have allowed moisture to escape outside, not showing condensation on the window itself. Your new, better insulated, and energy-efficient windows are airtight and do not allow humidity to escape. Therefore, condensation may appear on the window as a natural result of humidity within the house or building area and changes in the outside/inside temperature.

Health and Damage:

Even though it is normal, continuous buildup of condensation can damage your windows, house, and even your health. The excess moisture can cause mold to grow, water damage, and even rot on untreated wood. Keeping humidity levels between 30% and 50% helps decrease the changes of these issues, as bacteria and viruses grow in air that is above 60% relative humidity.

Steps To Reduce Condensation:

The best option to reduce humidity in your home is to adjust the areas in your home that create moisture and increase ventilation. Here are some tips to help do that.

- Utilize exhaust fans in the kitchen, laundry room, and bathrooms.
- Vent the gas burners and clothes dryers outside.
- Turn off humidifying devices, such as a furnace humidifier.
- Open fire-place dampers and attic/basement/crawl space ventilating louvers.
- Air out your home or turn on ceiling fans for air circulation.
- Open the drapes/blinds (winter condensation).
- Blow air across the window (winter condensation).
- Raise the temperature inside your home (winter condensation).