

# Condensation Causes and Cures

## What is condensation?

Humidity (invisible water vapor) is present in almost all air. When this water vapor comes in contact with a surface that is cooler, the vapor can condense into visible droplets of liquid. Condensation frequently occurs on glass surfaces first because they normally have a lower temperature than other interior surfaces in your home. You've often seen this happen to bathroom mirrors and walls after a hot shower, or on a glass of iced tea. These glass surfaces do not cause the condensation; they simply reflect the presence of moisture.

## What causes condensation?

It's natural to believe that your windows are the cause of condensation, but they aren't. Windows don't cause condensation; they simply prevent moisture from escaping to the outside and provide a highly visible surface on which to notice it. In fact, the "warm-edge" technology of Gorell windows and doors can actually help reduce typical condensation buildup on glass. Nonetheless, while weather-tight, thermally efficient Gorell windows keep cold air outside, they also keep moisture in. Occasional, mild condensation is a normal event and causes no real problems. Even so, when you see excessive condensation on glass surfaces, take it as a warning that you may have excess humidity in your home.

## Problems caused by excess humidity:

Humidity, water vapor, moisture and steam are all a form of water. This water in the air tries to flow toward drier air and mix with it. This process manifests itself as a force scientists describe as vapor pressure. Often a very powerful force, it can act independently of the flow of air that holds the moisture. Vapor pressure can force moisture easily through most of the materials used in building—wood, plaster, brick and cement. That's exactly what happens when excess humidity seeks to escape from the air inside your home to the drier winter air outside. If you experience this kind of condensation in your home, you have good reason to be concerned.

Excess humidity and condensation can pose serious threats to your home, from heavy droplets running off windows and staining woodwork to, in serious cases, less visible condensation penetrating and collecting in your walls and ceilings. This can damage wallpaper, paint or plaster and cause rotting wood, buckling floors, insulation deterioration, mildew and moisture spots and even structural damage to your home.

## What causes excess humidity?

The first step in eliminating excess humidity is to understand some of its causes. Every activity that uses water adds moisture to the air. Condensation problems increasingly result from the operation of everyday labor-saving appliances—gas furnaces, humidifiers, showers, ovens, dishwashers and washing machines. All these create much more water vapor in your home than was created in former years.

For example, 1000 cubic feet of gas burned will produce about ten gallons of water as the hydrogen in the water combines with the oxygen in the air. According to *Heating and Ventilating* magazine, which provides reference data on sources of water vapor for builders, cooking for a family of four adds 4.5 pounds of moisture a day to a house. Each shower contributes half a pound, weekly laundry adds 30 pounds, dishwashing adds 1.2 pounds. The average four-person household can easily release 150 pounds of water (more than 18 gallons) per week into the air at home! And most of the moisture must eventually escape outdoors to avoid excess humidity in your home.

## Controlling condensation:

According to the American Architectural Manufacturers Association (AAMA), controlling the amount of water vapor in your home is the most effective action you can take to prevent condensation problems. This begins with monitoring your home's humidity, using an accurate sling psychrometer or a humidistat. The following table shows recommended safe Relative Humidity levels to maintain for a 70° F indoor air temperature during the cold, winter season, based on extensive engineering studies at The University of

Outside Air Temperature	Inside Relative Humidity
-20° F or below	Not over 15%
-20° F to -10° F	Not over 20%
-10° F to 0° F	Not over 25%
0° F to 10° F	Not over 30%
10° F to 20° F	Not over 35%
20° F to 40° F	Not over 40%

Minnesota Laboratories:

*In most cases, reducing your humidity to these levels will cure troublesome condensation. Remember that these levels are for a 700 °F indoor air temperature. For higher indoor temperatures, lower humidity levels are required. Likewise, a warmer outside temperature permits higher indoor Relative Humidity.*

**Reducing humidity:** The best steps you can take for reducing excessive humidity levels and condensation in your home involve controlling sources of moisture and increasing ventilation:

Use exhaust fans in your kitchen, laundry and bathrooms. Vent all gas burners, clothes dryers, etc. to the outdoors. Shut off furnace humidifiers and other humidifying devices in your home. Be sure that louvers in your attic or basement crawl spaces are open and amply sized. Open fireplace dampers to allow an escape route for moisture-laden air. Air out your house a few minutes every day.

*For more information, call the PA Better Business Bureau (412) 456-2720 on a touch-tone telephone. Select Option 3, Automated Information Service; selection #3, Tell Tips; selection #2 Transfer to Tell Tips List; key in Tell Tip #51421 "Condensation on Windows."*