

Condensation

JGI012 (10/02)

The first cold day of autumn hits. Your windows fog up or water droplets form and drip slowly down the glass. A common reaction is to pick up the phone and dial the window manufacturer to explain the problem. But don't worry! This is *not* an indication that your windows are failing. The moisture on the glass is **condensation**; a natural phenomenon that, in most cases, can be easily eliminated.

Condensation occurs when excess humidity in the air is released onto a cold surface. Your windows or patio doors usually provide a visible, cold surface and therefore show the first signs of condensation.

Homes built today are more energy efficient and substantially more airtight than homes built just a few years ago. As a direct result, air inside the home is better captured, and there is less exchange with outside air. This leads directly to higher interior humidity levels as the moisture from interior activities has less opportunity to escape to the outside. You may never have had interior condensation in your older home but are now experiencing it.

Your family life style has a large impact on the humidity level inside your home. You might enjoy cooking pastas, rice, soups, stews and other high moisture-generating meals. You might enjoy long showers or baths, or wash many loads of clothes. You may even have an indoor spa or sauna. Variations in these and other moisture-generating activities often result in one neighbor experiencing window condensation and another not.

Interior Condensation

Condensation on the interior surfaces of glass is almost always due to high levels of interior humidity. This can lead to structural damage to your home (e.g. fungal infestation) or, in severe cases, medical problems for the occupants as a result of the development of molds. Because both the structural damage and the growth of molds frequently occur *unseen* in the cavity of the wall, the *visible* sign of condensation on a window is a good clue that you need to reduce humidity levels.

Therefore, it is important to control interior humidity. Monitor humidity levels with a **hygrometer**, available at your local hardware or home center store. The chart indicates the humidity level at which interior condensation may occur for different outside temperatures. As shown in the chart, when the outside temperature gets colder, a lower interior humidity level is needed to prevent condensation from occurring.

hygrometer / hīgrōmīter/ n
an instrument that measures relative humidity in the air

Outside Air Temperature	Inside Humidity at Which Condensation Occurs
20°	Over 35%
0°	Over 25%
-20°	Over 15%

The values in this chart are based on winter conditions of 70° indoor temperature with 15 mph outdoor winds and double-glazed windows.

Avoid Interior Condensation

- ▶ Vent all appliances outdoors
- ▶ Vent the attic
- ▶ Vent all crawl spaces
- ▶ Cover bare ground in crawl spaces with plastic sheeting
- ▶ Be sure all vent ducts are clear of lint and other obstructions
- ▶ Run exhaust fans in kitchen and bathrooms
- ▶ Turn humidifiers down as the temperature outside gets colder (if used for medical purposes, consult a doctor)

Low-E / lō ē / low emissivity / n
a coating on glass that reduces radiant heat-loss and the passage of Ultraviolet (UV) rays



Consider installing insulating glass (IG). IG units tolerate more indoor humidity before condensation develops than single-pane glass units.

TIP

For further protection, look at glass options such as **Low-E**. Low-E reduces heat-loss.

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- ▶ Use a dehumidifier
- ▶ Don't store firewood inside
- ▶ Open window coverings slightly to promote air circulation
- ▶ If necessary, relocate heat vents beneath windows and patio doors
- ▶ Have an air exchange system added to your heating system

Exterior Condensation

Condensation on the *exterior* of a window or patio door is a common occurrence, especially on insulating glass units. Just as an insulating glass unit keeps the cold air from entering the home, it also keeps warm air from escaping. For this reason, the exterior pane of an insulating glass unit is a much cooler surface than the interior pane. In the early morning, the sun-warmed air strikes the surface of the window's cold glass and releases its moisture in the form of "dew."

Avoid Exterior Condensation

- ▶ Close window coverings to reduce cooling of the glass surface by air-conditioning
- ▶ Remove or trim shrubbery close to windows to promote air circulation

Wood Windows & Patio Doors

As condensation occurs over time, there is a danger of moisture entering the wood. This could lead to fungal infestation. Take care to prevent condensation from penetrating wood surfaces by keeping windows and patio doors finished or painted and following the suggestions in this document to reduce humidity.

Vinyl Windows & Patio Doors

Vinyl window and patio door products have thermal properties similar to wood products, but are not subject to moisture damage. Vinyl products have a "weep" system designed to drain water to the exterior. If water does not drain quickly from the sill of the window or door, check the weep holes for blockage.

Aluminum Windows & Patio Doors

Windows and patio doors made with aluminum are especially subject to condensation because of aluminum's high *thermal conductivity*. This means the temperature of the aluminum will quickly change to the air temperature around it. The colder the outside temperature, the colder the aluminum frame and the more likely condensation will occur.

Summary

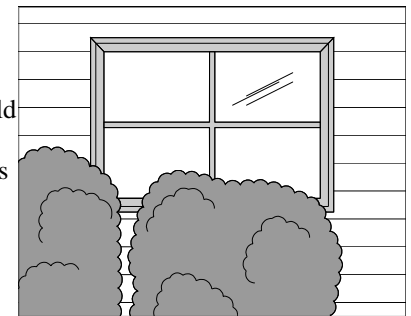
Condensation is a natural phenomenon that occurs on exterior and interior glass surfaces. In nearly all cases, it is *not* the result of a defective window or patio door. Care should be taken to reduce the effects of condensation. Proper ventilation is the most effective safeguard against indoor condensation. If condensation persists after following the precautions suggested in this document, contact a qualified heating and air-conditioning professional for further help and recommendations.

Condensation *between* the panes of glass is a different problem. If the condensation is still present after cleaning both the inside and outside of the glass, there may have been a failure of the seal between the two panes. Call us for assistance.

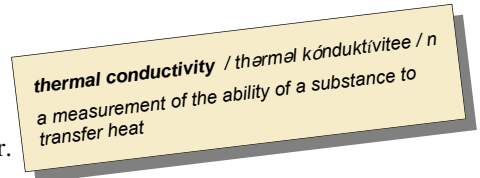
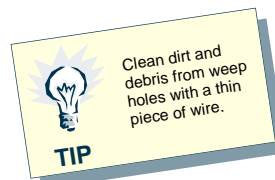
Temporary Interior Condensation

Condensation on glass may be a temporary condition that will correct itself. Listed below are four common situations:

- ▶ **Newly built homes:** Building materials (including paint, wall texture, green wood, etc.) contribute many gallons of water to the interior air. It often takes most of a year for all of the moisture to escape. Condensation is typically much reduced or eliminated by the second heating season.
- ▶ **Changing seasons:** A house absorbs moisture throughout the humid summer. The first few weeks of heating at the beginning of a cold season may cause temporary condensation. This moisture should dry out after a few weeks, causing less condensation.
- ▶ **Quick changes in temperature:** Drastic temperature changes can create temporary condensation during the heating or cooling season.



Shrubbery next to windows can lead to exterior condensation



For More Information...

The following websites may be helpful:

- ▶ http://energy-publications.nrcan.gc.ca/pub/renovate/Consumers_Guide_EE_Windows_Section05.cfm
- ▶ <http://www.wdma.com> (This site is helpful in regard to wood frame materials)

Note on websites: While these sites contained the desired information at the time visited, the information may not be the same or available at a later date.