

References:

1. "The Condensation Problem - Here Are the Causes and Cures," Canadian Builder, Vol. XIII.
2. Technical Bulletin #1, Ethyl Corporation.
3. "The Condensation Answer Book," Andersen.
4. Duane Johnson, "How a House Works," The Family Handyman, Nov. 1998, pp.94-101.
5. Committee on Environmental Health, "Toxic Effects of Indoor Molds" (RE9736), American Academy of Pediatrics Policy Statement.
7. Consumer Product Safety Commission and The American Lung Association, "Biological Pollutants in Your Home," U.S. Environmental Protection Agency.
8. American Lung Association, "Indoor Pollution: Biological Agents," December 29, 2000 www.lungusa.org/air/envindoorap.
9. Center for Disease Control and Prevention, "Molds and the Environment," September 1999 www.cdc.gov/nceh/asthma/factsheets/molds.

For more information, contact:

American Lung Association, www.lungusa.org
"Indoor Air Pollution Fact Sheet, Air Pollution in Your Home?"

U.S. Consumer Product Safety Commission,
800-638-8270 800-492-8104 (TTY).

U.S. Environmental Protection Agency
Indoor Air Quality INFO Clearinghouse
800-438-4318.

Centers for Disease Control and Prevention
"Molds in the Environment"
www.cdc.gov/nceh/asthma/factsheets/molds.

University of Illinois at Urbana-Champaign
College of Fine and Applied Arts School of
Architecture - Building Council Research "Moisture
Condensation" 800-336-0616.

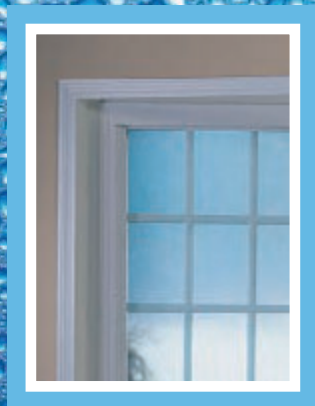


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WINDOW CONDENSATION

What your
windows are trying
to tell you . . .



If the windows in your home are continually fogging up or collecting moisture, don't be upset with your windows. They're sending you a message that may help save your home and your health . . .



Windows bring you more than sunshine and a view of the outdoors. They also can help you protect your home and your health.

Your foggy windows may be trying to tell you to reduce indoor humidity before it causes hidden, costly problems elsewhere in your home - peeling paint, rotting wood, buckling floors, insulation deterioration, mildew, even moisture spots on ceilings and walls.

This booklet is provided to help you understand the relationship between windows and condensation, and how to tell when persistent high humidity and condensation may be increasing your risk for home and health problems.



Do windows cause condensation?

No. Windows do not cause condensation. Windows are most often the first places where condensation can be seen.

You're probably not surprised or concerned when your bathroom mirror becomes fogged. You expect it after a hot shower. Your car windows fog up in humid weather (especially when the temperature drops suddenly) or in winter when you have several passengers. (These are typical examples of condensation. It usually occurs in cold weather, but also can occur during humid months when air conditioning is running.)

The mirror doesn't cause the condensation. The car windows don't cause it either. These are just the first places you actually see condensation. (Check your bathroom walls after a shower - you'll see condensation there, too. Run your finger along the wall. You'll see water on your finger, and you'll see the trail of your finger through the condensation on the wall.)

The same is true for the windows in your home.



What does cause condensation?

Condensation forms when warm, humid air contacts a cold surface. Moisture is in the air all around us. Warmer air can hold more moisture. As air cools, it contracts (just as people pull their arms and clothing tight around them when chilled) and its moisture condenses.

When the temperature drops, the first place you will see any condensation is on the windows. Your windows are the coldest surfaces indoors. During colder months, indoor air is much warmer and holds more moisture than outdoor air, which is colder and dry. Warm, humid indoor air cools and contracts as it contacts the cooler windows, and the moisture condenses on the glass.

Why is indoor air so humid?

Everyday living – Showers, baths, cooking, washing dishes, doing laundry, and cleaning all add moisture to the air in your home, as much as four gallons or more per day in some homes. We even exhale moisture into the air as we breathe.



Home construction – Today's energy-efficient, well-insulated homes help us hold down heating and cooling costs. But the same things that block outdoor air from entering our homes also keep moisture from venting to the outdoors.



How can humidity cause problems? I thought it was good for your health.

It was once believed that winter use of humidifiers helped people stay healthy. But studies have shown this to be untrue, particularly for healthy people. In fact, humidifiers can actually create health problems. While manufacturers maintain that humidifiers can benefit plants and furniture, the Association of Appliance Manufacturers states that no evidence exists to associate humidifier use with any medical benefits.

What kind of problems?

Health problems – Mold and mildew thrive in moist areas with plenty of organic material, such as wood, plaster and some types of insulation. Many types of

molds – and there are thousands – easily become airborne (it's often their means of reproduction). When inhaled or ingested, molds are known to cause local or systemic allergic reactions, sinus and nasal irritations and infections, chronic respiratory problems, dizziness, lethargy, and trigger attacks in people with asthma.

Structural damage – But nature, as usual, will find a way to maintain balance. Because humid indoor air tends to be under higher pressure than outdoor air, indoor air constantly pushes its way outward, to the area of lower pressure, right through wood, plaster, insulation, and concrete. This process can cause insulation to deteriorate, paint to blister and peel, unsightly stains on walls and ceilings, rotting of floors, wall supports and other structural supports, including foundation damage.

Is condensation more likely in certain climates, types of homes or windows, or times of year? Yes. It's more likely to occur:

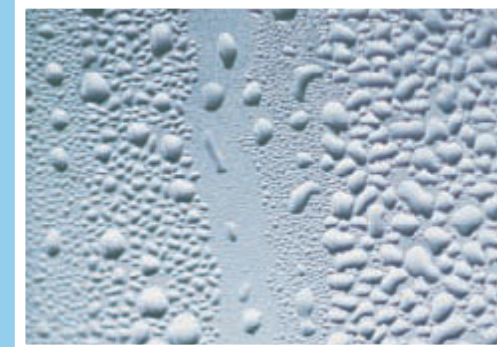
- In areas where January temperatures average 35°F or less.
- In summer and fall, when homes pick up moisture from damp air. In fall, when the heating season begins and windows are closed, indoor air picks up the moisture. For the next week or two, temporary condensation is likely.
- Condensation can also form on the outside of your windows. This usually happens when it is hot and humid outside and is called reverse condensation. When the air is cooler inside your home, it makes the surface of the glass cooler than the dew point. Plants around your window can increase the chance of having reverse condensation. You are also more likely to see it on clear nights when there is little or no wind.
- With sharp, quick drops in temperature, creating temporary condensation problems.
- For one year after construction or remodeling, while building materials dry out. Building materials hold a massive amount of moisture; condensation should be expected through the first heating season.
- On bay or bow windows, where air circulation is often restricted and windows tend to be a few degrees cooler since they project out from the insulated house wall.

- When drapes are closed and shades are pulled down. Today's heavily insulated drapes and tighter shades restrict air flow over window glass and can contribute to condensation problems.



I have condensation on my double-glazed windows. How can I tell if it's from bad seals or indoor humidity?

Before calling for repair service, try this easy test. Run your finger through the area where the condensation is formed. If your finger gets wet and leaves a trail through the condensation, it's on the room side of the glass. That tells you that condensation is forming because of excessive indoor humidity. (Another tip-off: if more than one window is showing condensation, it's extremely unlikely that the seals are bad on all of the windows. It's probably indoor humidity.)



If your finger remains dry and leaves no mark in the condensation, the moisture is collecting between the window panes. This tells you that the seal in that window has somehow been damaged and needs repair or replacement.

I didn't have condensation problems with my old windows. Why now?

If your old windows were drafty, those cracks allowed excess moisture to escape outdoors (when the wind wasn't blowing in). Your new windows are better insulated, so indoor humidity can't escape. Windows do not cause condensation, nor can they eliminate condensation. Your windows are alerting you to excess humidity in your home.

How can we reduce indoor humidity?

1. Increase ventilation.

- As a temporary solution to an acute problem, open a window in each room for just a few minutes, letting stale, humid air escape and fresh, dry air in. Your heat loss will be minimal.
- Vent all gas burners, clothes dryers, etc., to the outdoors.
- Install kitchen and bathroom exhaust fans to draw steam outdoors.
- Keep attic vents open and clear.
- Install storm windows to keep interior glass warmer.

2. Control indoor moisture.

- Set your humidifier at the level recommended below for winter temperatures:

Outside Temperature	Inside Relative Humidity
-20°F	15-20%
-10°F	15-20%
0°F	20-25%
+10°F	25-30%
+20°F	30-35%

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Indoor humidity can be checked with a humidity monitor or regulated with a humidistat, available at most building supply stores and home centers.

- If you're an indoor plant lover, group them in one sunny room and avoid overwatering.
- Waterproof basement floors and walls. Run a dehumidifier if needed.
- Insulate under the seat and head of bay and bow windows where condensation forms to keep window glass warmer. Run an electric fan near the window to help air circulation.