

Controlling Moisture in Your Home

To solve a moisture problem you have to limit the sources of moisture or make ventilation more effective. Often it takes a combination of both strategies.

Moisture problems are most common in homes without central heating which by design, helps to circulate air flow and ventilate the home. Homes with base board, wall and radiant electric heaters, and poorly insulated homes more commonly experience moisture problems.

You can easily measure the moisture level in you home with a hygrometer, an inexpensive device available in some hardware stores, and through green house supply outlets. It measures relative humidity – an indicator of the amount of water vapor in the air. Most people are comfortable when the relative humidity is 40% - 60%. Move the hygrometer from room to room, checking humidity levels throughout the house.

If you don't have a hygrometer, answering yes to the following questions indicates a problem:

1. Do you often have condensation on double-pane windows during the winter?
2. Do you have problems with mold or mildew on walls or ceilings?
3. Do any rooms seem damp or stuffy?

MOISTURE BASICS:

Excessive moisture in a house is caused by one or more of the following:

- Sources of moisture from inside the house
- Sources of moisture from outside the house
- Inadequate ventilation

Today's article will address moisture sources outside of your house, and inadequate ventilation.

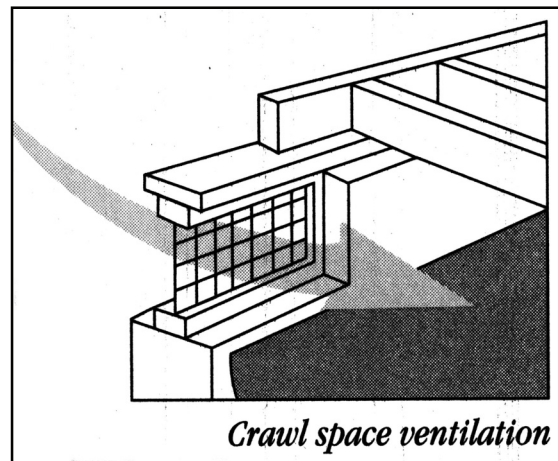
The amount of moisture the air can hold depends on temperature. Warm air can hold more moisture than cold air.

Moisture moves from areas of high humidity to areas of low humidity. In the winter, the air inside most houses is warm and moist. When it's colder outside than inside, the moist inside air moves toward the outside, primarily through small cracks and holes in the walls and ceilings around electrical outlets and switches, pipes, wires, windows, and doors.

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Outside Sources of Moisture

CRAWL SPACE -- The crawl space under the house can be a major source of moisture to the interior of the house if there is standing water present, or if there is not a continuous plastic vapor barrier to cover the dirt or concrete.



Crawl space vents should be placed as close to corners as possible with the remaining vents evenly distributed along the walls. Crawl spaces with low amounts of water vapor may need as little as one square foot to ventilation area per 300 square feet; those with seasonal standing water and/or high levels of water vapor (even with a continuous plastic vapor barrier) may need as much as one square foot of vent area per 150 feet of crawl space area. Exposed dirt or even a thin slab of porous concrete in the crawl space under the house should be covered with black, 6-mil (0.006 inch thick) plastic sheeting to reduce the amount of water vapor entering the house. Overlap the edges of the plastic at least two feet and extend it about 4 inches to 6 inches up the foundation walls. The plastic should not come in contact with the wood of the house structure. Corners and edges of the plastic can be secured with bricks or rocks.

ATTIC – Your attic is unlikely to be a source of moisture to your house, unless the roof leaks. But the attic can develop serious moisture problems of its own if the inside of your house has a high

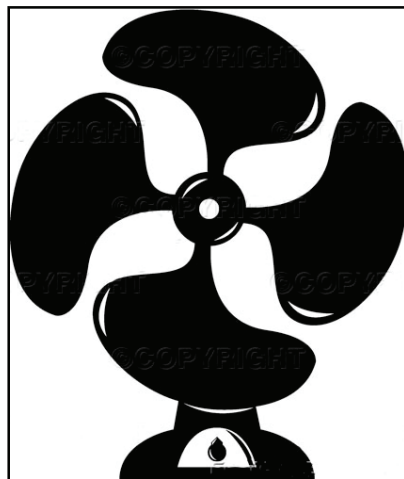
humidity level. Remember that moisture moves from an area of high relative humidity to an area of lower relative humidity. During the heating season, moist air from inside your house travels to the attic through small holes and cracks. Unless your attic has good ventilation, the moist air can condense, become trapped, and cause mildew, rotting wood, and wet attic insulation. If severe enough, the condensation can drip through and damage the ceiling below.

Limiting outside sources of moisture

- If you have a crawl space, make sure that you have the recommended number of crawl space vents, that they are not obstructed, and that they are distributed well for cross ventilation.
- Be sure that under floor insulation over a crawl space has been installed with its vapor barrier side up against the under side of the subfloor.
- If you have a crawl space, make sure a black plastic vapor barrier covers the ground, overlapping at each joint and extending up the foundation wall.
- Check you attic for signs of moisture (stained rafters or roof sheathing, damp insulation) and for adequate venting. Add more venting if you find any problems not related to a roof leak.

Inadequate Ventilation

Good ventilation is critical to controlling moisture levels in your home because many household activities such as cooking and bathing produce moisture. Ventilation moves moist air out and helps replace it with drier outside air. However, simply opening windows and doors may not be adequate enough and may be uncomfortable depending on the season. The most effective ventilation is provided by fans that are the right size and properly installed.



Analyze you home’s ventilation. Make sure you have a “spot ventilation” fan in any room where moisture or odors are produced. Spot ventilation fans carry moisture and pollutants directly from the

source to the outside. These fans must have ducts that end outside the building, connecting directly to wall cap or roof cap. The wall or roof cap prevents rain and drafts from entering the duct. Check each fan's duct. Here's what to look for:

- What's the duct's diameter? Fan exhaust ducts should generally be a minimum of 4 inches in diameter to be effective at moving air. Upgrading smaller ducts to a 4" diameter will improve fan performance.
- Is the duct smooth metal or is it "flex duct" (flexible metal with spiraling ridges)? Although flex duct is often used, smooth metal ducts move air more effectively than flex duct because there's less resistance when air moves through smooth metal. If flex duct must be used, make sure it is at least 4" in diameter.
- How long is each duct: Short duct runs are best. Long ducts restrict air flow, especially when flex duct is used. For average bath fans, four-inch flex duct should be no longer than 6 ft.

Condensation on Windows

Condensation occurs when warm, moist air comes in contact with a cool surface. In your home, this cool surface is most often a window. Reducing the humidity level inside the house by controlling moisture sources and increasing ventilation will help control condensation, especially on double pane windows.

Because of their high heat loss rate, single-pane windows nearly always experience winter condensation problems, even when indoor moisture is controlled. Due to its high heat loss rate, the aluminum frame of a window will nearly always experience seasonal condensation, unless an outer storm window is added.

When storm windows are added to single pane windows, the problem of condensation on the inner surface of the original window will be reduced. Sometimes, if the inner window is poorly sealed, warm moist air from the house will enter the space between it and the storm window. Condensation may appear on the inner surface of the storm window. Sealing the original window will reduce this problem.

To solve a condensation problem with storm windows, identify where the condensation occurs. If condensation is on the inside surface of

glass, try weather stripping your storm windows to keep cold air out. If the condensation is on the outside layer of glass, try sealing air leaks on the inside of the window by replacing weather stripping and old putty. If the condensation on the outside window persists, sometimes you can add ventilation, or “breathing holes” around the edges of the outer storm window to permit moisture to escape.

A modern, vinyl frame, double-glazed window will rarely experience condensation on the inner glass surface if relative humidity in the house is maintained below 60% during the winter.

This article is based on a publication produced by Puget Sound Energy. Additional sources for winter weatherization and energy conservation include the following:

www.OPALCO.com (free residential energy audits, call 376-3571)

www.opcco.org (energy conservation program for low income OPALCO customers, call 800-649-5121 ext 310)

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