CLEMSON EXTENSION

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RESIDENTIAL HOUSING

Winter-Time Moisture Problems in Residences

Moisture levels inside homes in winter can be high enough to cause mildew and other problems. On the other hand, winter dryness inside some homes is also a problem; thus the control of moisture levels inside a house in winter by either adding or eliminating moisture vapor is desirable.

Problem situations during the winter are usually related to excessive dryness inside homes. The problem is often associated with wood burning stoves and fireplace inserts. Forced hot air central heating systems sometimes add to drying conditions, also. Adding moisture by placing containers of water on wood stoves, by adding a humidifier to central heating systems, or by installing a separate humidifier in the home is usually a satisfactory solution.

Questions relating to mildew and excessive moisture conditions have increased noticeably, however. In the past, problems with excessive moisture were associated frequently with the use of unvented gas space heaters in homes and could be quickly identified. New moisture problems are being created now because for every gallon of kerosene burned in an unvented kerosene heater, 1.1 gallons of water is produced. In very tightly sealed homes, such as those that are well insulated, weather-stripped and have storm windows, use of an unvented kerosene space heater can at least double the amount of moisture vapor generated in a house each day. House areas with stagnant air and air pockets may easily have moisture conditions favorable to mildew growth.

Air changes per hour inside tightly sealed homes are reduced considerably; thus the venting out of moisture vapor is lessened and can build up from day to day to high levels. It takes only 4 to 6 pints of water to raise the relative humidity of a 1000 square foot house from 15% to 60%. A comfortable level would be between 25% - 50%. Mildew grows at 60^0F and above, and 60% relative humidity.

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Some sources of normally generated moisture vapor in a house are:

	Amount of Water Produced
One person breathing	- 1/8 pint per hour
Washing dinner dishes	- 1/2 pint
One shower bath	- 1/2 pint
Mopping floor of a 150 sq. ft. kitchen	- 4 1/2 pints
Burning 1 lb kerosene unvented (6 1/2 lbs/gal)	- 1 1/2 pints
Burning 1 lb methane (unvented)	- 2 1/4 pints
Burning 1 lb propane (unvented)	- 1 1/2 pints

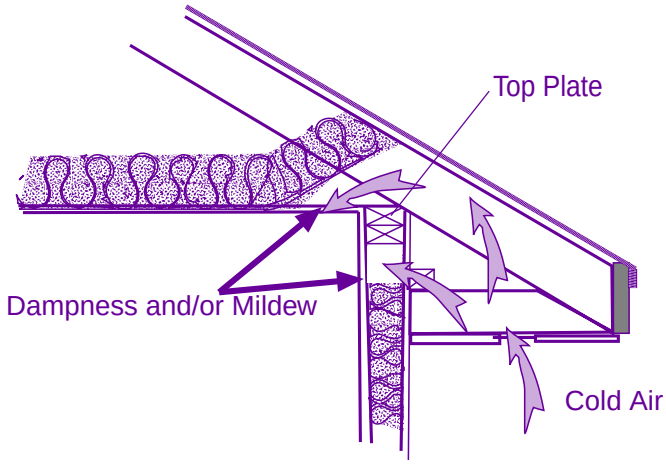
The presence of mildew growth in houses in winter is immediately a sign of excess moisture at that spot. The presence of continuous condensation on windows may be another. If frost or ice forms on glass or metal frames and sash or if paint peels and wood rots, there is certainly excess moisture. A single pane of glass gets so cold that moisture condenses and runs down in winter. Double glass and/or a heating vent located beneath the window stops the problem. But very excessive moisture vapor conditions will counteract these measures. In high moisture producing areas (kitchens, baths, and laundry), ventilation is required.

Often moisture will condense on windows causing wetness and dripping while the relative humidity in the house is low enough to cause nasal and breathing problems. The reason for this is that moisture and temperature are related. Condensation on windows

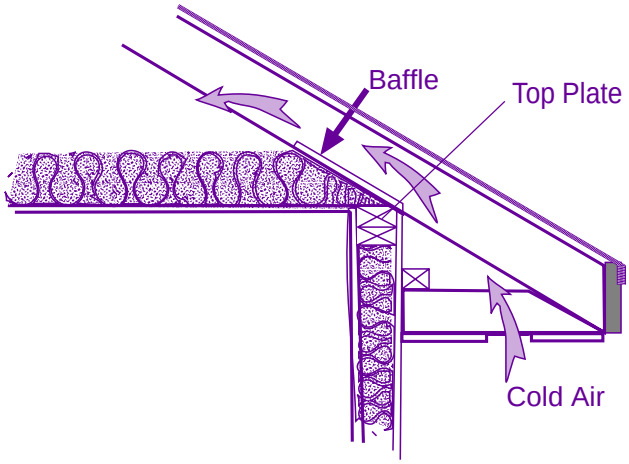
results more from the cold window surface than from excessively high moisture in the room. The solution to window condensation is achieved by warming the window surface above the dew point by adding storm windows and/or placing heated air vents such that the warm air can remove the moisture from the glass much like the defroster works on the windshield of a car.

If moisture condenses between the permanent window and the storm window, leakage of air around the permanent window is allowing warm moist air from inside the house to seep into the air space between the glass panes. In this case, an effort should be made to seal the leaking spaces, or the air space between the two windows must be ventilated. Do this by drilling two 3/8" diameter holes at the top and bottom of the storm window or loosen the storm window slightly.

In cases where mildew or dampness is appearing on ceilings at edges near outside walls (not just in poorly ventilated corners of rooms), there is a possibility that ceiling insulation is not properly installed. Insulation must extend over the top plate of the wall and be fitted tightly to the top plate. Cold wind can blow under insulation and chill the ceiling, where vapor will subsequently condense. Similarly, wall insulation can settle allowing cold spots to occur at the top of walls. In both cases, insulation must be repositioned or filled in.



PROBLEMS WITH INSTALLED INSULATION



PROPERLY INSTALLED INSULATION

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