

Controlling Moisture in Homes

Energy-efficient construction techniques that emphasize low levels of air leakage have increased the potential for moisture problems in homes and other light-frame buildings. Excessive moisture in wall cavities can decay wood if the moisture remains for extended periods at temperatures greater than approximately 50°F.

Research at the Forest Products Laboratory (FPL) has shown that short periods of moderate condensation in walls during cold winter periods do not necessarily lead to permanent damage. However, high levels of indoor humidity during the winter in cold climates can result in moisture remaining well past the winter season, which can lead to serious moisture problems in walls and windows. Human activities (such as showering and cooking), the human body itself, plants, and lack of adequate ventilation cause excess humidity. Damp basements or crawl spaces or a leaky roof can add to this moisture.

Maintaining a reasonable level of indoor humidity (about 40% or less) is the most effective method of moisture control. This level can often be maintained with minimal heat loss by using exhaust fans in the kitchen and bathrooms or a central ventilation system. Another option that reduces heat loss but maintains sufficient ventilation is an air-to-air heat exchanger. Dehumidifiers can lower indoor humidity in regions with milder and more humid winters; because they are generally designed to operate at higher temperatures and humidity levels, dehumidifiers are often not practical in cold winter climates.

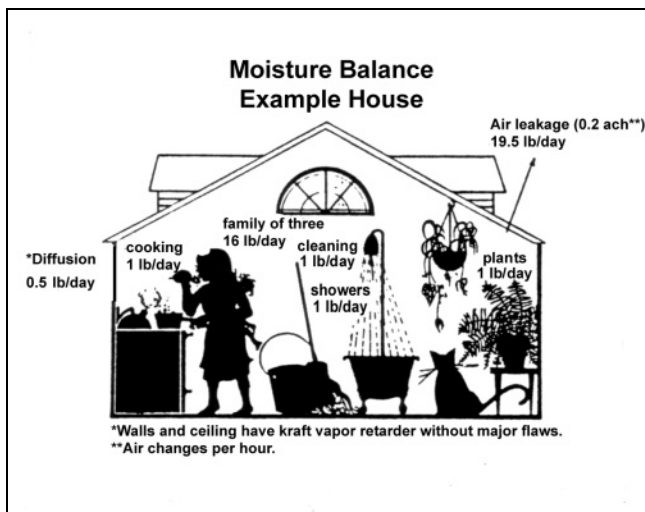


Example of major damage due to excessive moisture buildup.

Air barriers and, to a lesser extent, vapor retarders play an important role in preventing condensation in walls and ceilings. Vapor retarders should be applied to the warm side of insulated floors, walls, and ceilings. However, they may have little effect on indoor humidity because vapor transmission through walls and ceilings is often only a small part of the total moisture exchange in the house.

In warm southern climates, problems result from moisture coming in from outside rather than indoor humidity being too high. To remedy these situations, the design of the wall (placement of an air barrier or vapor retarder and the amount of insulation) is a key factor. Proper wall design depends on the outdoor relative humidity and temperature during both summer and winter.

Results of studies underway at FPL on appropriate moisture management should help builders and homeowners alleviate many home moisture problems.



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