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Condensation & Humidity: A Year-Round Problem

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Condensation and moisture are a year round problem. It can be a daily battle if some time is not taken to try to understand the hows, whys, and wherefores behind this phenomenon.

Everyone knows what happens to a metal can or a glass jar when it is taken out of the refrigerator. The outside surface of the container and its contents are cooler than the surrounding, or ambient, temperature. This causes the container to sweat or condense. The same effect takes place when you see your home's windows sweat or condense. The outside cooler air against the glass is causing the inside warm, moist air to condense against the glass. This is a basic explanation of a complex phenomenon of physics, happening in many homes in

our climate. In most cases, it makes itself more visible during the winter months. This is by the condensing of warm, moist air on windows, mildew odors and stains at the ceiling/wall, or wall/floor joints, and the frosted nails protruding through the roof sheathing in the attic.

During the warmer months, this dragon, so to speak, keeps itself mainly to darker unvented areas below grade. These areas can be basements, root cellars, or crawl spaces. To understand this problem, let's look at some facts and figures that may surprise you. The Agricultural Extension Service of the University of Minnesota conducted a study and found that with an average family of four, a surprising amount of moisture or water vapor is generated into the air of a home each day.

For example, human respiration by this family of four produced 8 to 12 pounds of water vapor each 24 hour period. Cooking for the same family on a gas appliance added 5 pounds per day. Showering adds an average 1/2 pound per shower. Drying clothes after spinning adds one pound of water vapor per each pound of clothes dried, if dried inside, or in a dryer vented inside the home. Living plants and domestic duties such as mopping, wall washing, and so on all add moisture to the air. The study concludes this family can average up to 25 pounds of water vapor in the home per day. At 8.3 pounds per gallon of water, this comes out to over 3 gallons of water each and every day.

This does not take into account other sources of moisture, such as infiltrated moisture. Infiltrated moisture comes through basement walls, crawl spaces, closets, kitchens or window bays that do not have ground vapor retarders. It can also be traded to poor caulking, weatherstripping, and exterior foliage too close to the buildings causing capillary action due to poor air circulation.

Cross-referencing this information with another study done by the University of Illinois at Urbana-Champaign Small Homes Council/Buildings Research Council, it takes this same family of four only 4

to 6 pints of water (4.16 to 8.4 lbs. Of water vapor) in the home air to raise the relative humidity in a 1,000 square foot home from 15% to 60% relative humidity.

Further studies, such as retrofitting for energy and moisture control compiled by Dr. Charles Wing, show this problem is even more severe in new homes during their infant years. This, of course, is due to the new materials trying to dry out and cure within the newly built structure. So, what does all this mean to the home owner? Basically that high humidity content within a home can be both unhealthy to the occupants and to the structure.

Health, for occupants, especially to respiratory and heart patients, can become a severe problem. If a home is holding a high moisture content in its environment, it is most likely holding other indoor air pollutants created by man. These can range from cooking odors to fluorocarbons from compressed spray cans.

The natural pollutants are also contained, one of which is mildew spores caused by the dampness or high water content in the air. Paint peels and flakes. Insulation also loses efficiency or R-value. Dry rot forms and the structure deteriorates from the inner wall cavities outward. Construction materials age prematurely, shrink and curl, then expand and twist constantly. In the winter, this problem is readily seen just by looking at the roofs, windows, and stains within the home. In the spring and summer, the tale is told through the musty odors in the basements and crawl spaces. It can also be compounded by opening basement windows on hot, humid summer days. When the warm humid air contacts the cooler concrete walls and floors condensation forms just as on the jar we spoke of when taking it out of the refrigerator.

What can be done about all this? The answer is to keep the relative humidity of the indoor environment down to acceptable levels. This can be done both mechanically and naturally. In the summer, refrain from adding to the problem by opening basement windows. Use a dehumidifier to help draw out the water vapor from the air and the porous structural materials such as the foundation block. Have fans operating in enclosed areas to help keep the air circulating. Keep your home well vented and insulated. Use vapor retarders where needed, such as on the crawl space floors, and under jutting bays. These improvements will keep you, and your home, in good condition.

We hope this information has been helpful to you! If you have any further questions, please visit our website at www.aroundyourhouse.net, or contact Jim at Around Your House.

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