

Foreword

"In fact, sweating windows can be a godsend. They serve as a danger signal, showing when indoor moisture is trying to get out . . ."

From a column by David Bareuther,
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WINDOW CONDENSATION . . . AND WHAT TO DO ABOUT IT

Each winter sees more and more home owners virtually interested in the subject of window condensation. It's not a happy interest. It stems from bad experiences with window condensation which range from irritating to downright expensive.

It may strike you as odd, but the growing condensation problems of the nation are caused by progress.

Yes, if you have trouble with window condensation it's probably because you live in a "tight" modern home that you can heat for a fraction of the money it took to heat the house your parents were raised in - a home that's cleaner and more comfortable besides! And your condensation problems also result from wide-spread use of several labor saving appliances that make life easier than it used to be. In addition, the extensive use of moisture migration retardants such as vapor barriers tend to contain the moisture in the structure.

This booklet explains the moisture problem of the "tight" home. It offers suggestions for curing condensation problems in existing homes.

What causes "trouble" condensation?

A little fog on the lower corners of your windows now and then probably doesn't bother you. It shouldn't. By the time you've thought about it a second time it usually has gone away.

But what we're talking about is **excessive condensation . . . troublesome condensation . . . condensation that covers whole windows with fog or frost . . . water that runs off windows to stain wood-**

work, or in serious cases even damages the wall-paper or plaster.

If you have this kind of condensation on your windows you have good reason to worry . . . and a good reason to act.

Don't worry so much about the moisture on your windows . . . this is just a symptom of excess humidity throughout your home. You should worry more about what excess moisture may be doing elsewhere in your home. It may be freezing in the insulation, melting, and damaging your ceiling and walls exactly like a roof leak when warm weather comes. Or it may be forcing its way out through siding to form blisters under your exterior paint. That means the most expensive kind of paint job.

It's natural and easy in such cases to blame the paint, or the insulation, or the windows. But it's wrong to blame them.

The real villain is invisible. It's water vapor . . . too much water vapor. The best - usually the only way to prevent this trouble is to get rid of excess water vapor.

Once you've equipped your windows with good storm windows or replaced them with insulated windows there isn't very much more you can do to the windows to lick condensation.

More about windows later . . . but now, let's go back to the beginning with the question:

What is humidity?

Humidity, water vapor, moisture, steam. They're all the same. They are all a form of water. Humidity is present in varying quantities in all air. **Moisture in wet air tries to flow toward drier air and mix with it.**

Scientists describe this force as "vapor pressure". It is often a very powerful force indeed. It can act independently of the flow of the air which holds the moisture. Vapor pressure can force moisture easily through wood, plaster, brick, cement . . . right through most of the materials we use to build our homes. That is exactly what happens when moisture seeks to escape from the humid air usually found inside your home to the drier winter air outside.

More moisture trapped in less space

Certain building materials stop water vapor. Glass is one of these. Also on this list are some varnishes,

paints, tiles, plastic wall coverings and vapor barriers. Vapor-seal insulation is designed specifically to stop the escape of water vapor and protect the insulation, exterior paint and your walls from the ravages of water.

Increased use of these "moisture trapping" materials in the last few years has created the modern "tight" home. Moisture created by bathrooms, kitchens, laundries and occupants no longer flows easily to the outside. The modern insulation and construction that keep cold air **outside** also keep moisture in. So it is very easy to build up excessive and even harmful moisture levels in such homes.

First, more washing, more bathing, more showers, more appliances, all pour more water vapor into homes than in former years.

Heating and Ventilating magazine provides builders with reference data on sources of water vapor. For instance, cooking for a family of four adds 4.5 lbs. of moisture a day to a house. Each shower contributes half a pound; a weekly laundry, 30 lbs.; human occupancy, 6 to 8 lbs. per day; dishwashing 1.2 lbs., etc., etc.

So you can see that the modern living of a family of four can easily release 150 pounds, or more than **18 gallons** of water per week into the air in your home! And houses with no basements have further moisture problems.

Now, increased production of humidity is only part of the story.

Houses generally have been growing smaller and this means an even greater concentration of water vapor which is trapped by modern tight construction. It means **more** moisture contained in **less** space.

All of this moisture **must** eventually escape from your home. No wonder we've created a condensation problem for ourselves.

THE GREAT HUMIDITY MYTH

Some humidity **is** necessary for comfort and may help health, and with older houses it was (and still is) a struggle to keep **enough** moisture inside the house.

But with modern, "tight" homes the situation is completely reversed. The problem is to get rid of moisture into the air. They certainly aren't discour-

aged by people who sell humidifying devices, or people who install them in heating plants. They aren't discouraged by the danger sign of condensation on windows. Sometimes they aren't even discouraged by an exterior paint job costing several hundred dollars.

Let's turn the light of reason on this humidity myth.

See what the director of a leading research organization says. This quote is from the book, **New Frontiers for Home Builders**, by C. W. Smith, director of the Housing Research Foundation of the Southwest Research Institute at San Antonio:

" . . . in the more tightly built modern houses the moisture given off by showers, laundry equipment, cooking and by the occupants themselves puts more humidity into the air than is needed and there is little likelihood that the humidity level would ever become so low as to be harmful or irritating."

"High humidity, however, can greatly contribute to the deterioration of a house and to the discomfort of the occupants."

Recommended humidities are healthy

Most authorities agree with Prof. C. P. Yaglou of the Harvard School of Public Health that any inside relative humidity higher than 40 percent is **undesirable** in winter.

These same authorities agree that the humidities recommended for homes by the University of Minnesota Engineering Experiment Station are normally adequate for comfort and health. (See table)

In fact these humidities are **higher** than could be attained in houses built before the days of modern insulation, heating and weather-stripping.

In other words, the first step in solving condensation problems in your home is a **willingness** to reduce humidity. If you will decide to keep moisture down to levels recommended by engineering research organizations and by most paint, window, insulation and heating manufacturers, you are on the only possible path that leads to control of troublesome condensation.

If you are unwilling to reduce moisture . . . if you insist on keeping relative humidity at 40 percent, 50 percent or more . . . you might just as well forget about getting rid of window condensation and other problems caused by water vapor.