

Condensation

We encourage clients and real estate agents to call us with technical questions. We get lots of them - and the flavor of the month is condensation.

We don't want to bore you with technical terms like vapor pressure differential. Let's keep this simple.

There are two rules at work here:

1. When warm moist air touches something cool, condensation will form.
2. Warm air can hold a lot of moisture; cold air cannot. (While warm air can hold a lot of moisture, it doesn't necessarily have to. Take a trip to Arizona).

Despite the threats of global warming, it's still pretty cold outside in the winter. Consequently, windows are cold. If the inner glass surface is extremely cold, condensation (in the form of water or ice) will form, even in a house which has normal indoor humidity. This, believe it or not, is the principle reason for storm windows. The exterior pane of glass provides enough of a buffer zone, that the surface temperature of the interior pane of glass stays warm enough, and condensation is less likely to form.

After doing what we can to raise the temperature of cool surfaces, we should turn our attention to reducing the moisture in the air. The easiest way to maintain low humidity levels is to buy an old house that is not particularly well sealed. Admittedly, the house might be drafty but the drafts mean that cold outside air is sneaking into the house. When that cold air warms up it will have very low humidity. Similarly, warm air that has picked up moisture from cooking, bathing, etc is flushed out of the house.

Unfortunately, this approach flies in the face of current thinking. Modern homes are sealed tightly because every bit of cold air which leaks into a house means that warm air must leak out. This is not efficient.

Another way to get cold dry air into your house is to use up the warm moist air within. In many houses, air from within the house is used by the furnace, hot water tank and fireplace to create combustion and maintain proper draft up the chimney. This warm moist air escapes up the chimney causing cold dry air to enter the house and make up the difference.

Energy efficient homes don't want to waste this inside air (which you have already paid to heat) by letting it go up the chimney. Consequently, most modern furnaces and fireplaces, bring in outside air for combustion, which increases efficiency.

Taken to the extreme, the most efficient house imaginable would not allow any cold outside air to leak inside nor would it use any inside air for combustion. While the heating bills would be low, the windows would be dripping with condensation and the indoor air quality would be terrible.

The high tech solution is to put in a heat recovery ventilator (also known as an air-to-air heat exchanger). As you exhaust the stale contaminated air from inside the house you replenish it with fresh air from the exterior. While the fresh air and the contaminated air are not allowed to touch one another, the heat from the exhaust air is transferred to the fresh air coming into the house.

In conclusion, condensation within houses requires two major ingredients - humid air and cold surfaces. If you increase the temperature of cold surfaces by adding storm windows and reduce the humidity levels by venting clothes dryers to the exterior, using bathroom and kitchen fans etc., you should be fine. If you still get a little condensation, go to the low tech solution. Open a window!