

## Part 1: The Facts about Mold, Damp Buildings & Sick Building Syndrome

*(this is part 1 of a 3 part series)*

In recent years, we've seen a growing number of flood and hurricane events, especially here in South Carolina. Wet days, tidal flooding and just the day-to-day humidity we experience here in the south can over time, wreak havoc on our homes. Regardless of where or how the moisture is entering the home, it will almost always lead to...the dreaded **MOLD**. You've seen the pictures online of drywall covered in black mold. I don't know about you, but these images give me nightmares!



You may have lived or visited a home and recognize the tell-tale signs: the distinct “sour” smell, squishy areas in the floor, discolored spots on the ceiling or bubbly drywall. Or you may see features that spell trouble: dank crawl spaces with standing water, HVAC ducts running through crawl spaces or in an uninsulated attic, wall-to-wall carpet over a concrete slab or vinyl wallpaper. Many older homes -- and many new homes -- come with an array of problems that can eventually lead to mold and fungi growth. I speak from experience! My home is an uninsulated cinder block home with a crawl space from 1957. I've had to learn first-hand how and why these issues can occur. Homes were very “leaky” before air conditioning was a thing, but now we live in conditioned spaces for a large portion of the year, especially in the Southeast. Moist air (vapor) leaks from unintended places and can lead to a build up of moisture in undesirable places such as wall cavities and can eventually lead to mold growth. Furthermore, air leakage from places such as musty crawl spaces and moldy wall cavities can lead to poor indoor air quality.

To make matters even worse, studies have shown that, apart from mold, bacteria and mite-related contaminants, moisture contributes to the release of non-microbial chemicals into the indoor air. It has been known for many years that the rate of release of formaldehyde from composite building materials containing urea-formaldehyde resins, such as particle board, increases with the humidity of the surrounding air (van Netten et al., 1989). In chamber studies, Andersen et al. (1975) found that increasing the RH from 30% to 70% doubled the rate of formaldehyde emissions from particle board.

Most indoor air pollution comes from sources inside the building. For example, adhesives, carpeting, upholstery, manufactured wood products, copy machines, pesticides and cleaning

agents may emit volatile organic compounds (VOCs), including formaldehyde. Research shows that some VOCs can cause chronic and acute health effects at high concentrations, and some are known carcinogens. Low to moderate levels of multiple VOCs may also produce acute reactions (“Indoor Air Facts no. 4: Sick-Building Syndrome,” Environmental Protection Agency).

 <p><b>BUILDING MATERIALS</b></p> <ul style="list-style-type: none"> <li>• carpets &amp; adhesives</li> <li>• sealing caulk</li> <li>• paint</li> <li>• composite wood products</li> <li>• upholstery fabrics</li> <li>• solvents</li> <li>• varnishes</li> <li>• vinyl flooring</li> </ul>	 <p><b>HOME &amp; PERSONAL PRODUCTS</b></p> <ul style="list-style-type: none"> <li>• air fresheners</li> <li>• fuel oil &amp; gasoline</li> <li>• cosmetics</li> <li>• ozone-producing products</li> <li>• cleaning products</li> <li>• moth balls</li> <li>• vehicle exhaust</li> </ul>	 <p><b>FUELS &amp; MACHINERY</b></p> <ul style="list-style-type: none"> <li>• cooking</li> <li>• dry cleaning</li> <li>• photocopiers</li> <li>• space heaters</li> <li>• dry cleaning</li> <li>• tobacco smoke</li> <li>• wood-burning stoves</li> <li>• stored paint &amp; chemicals</li> </ul>
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(“Types of VOCs.” Image from AllergyConsumerReview.com.)

According to the Environmental Protection Agency’s article, “Indoor Air Facts no. 4: Sick-Building Syndrome,” the causes of SBS are:

- Inadequate ventilation (i.e. improperly sized/functioning HVAC system);
- Chemical contaminants from indoor sources (i.e. VOCs);
- Chemical contaminants from outdoor sources (i.e. exhausts, nearby factories, etc.); and
- Biological contaminants (i.e. bacteria, mold and fungus).

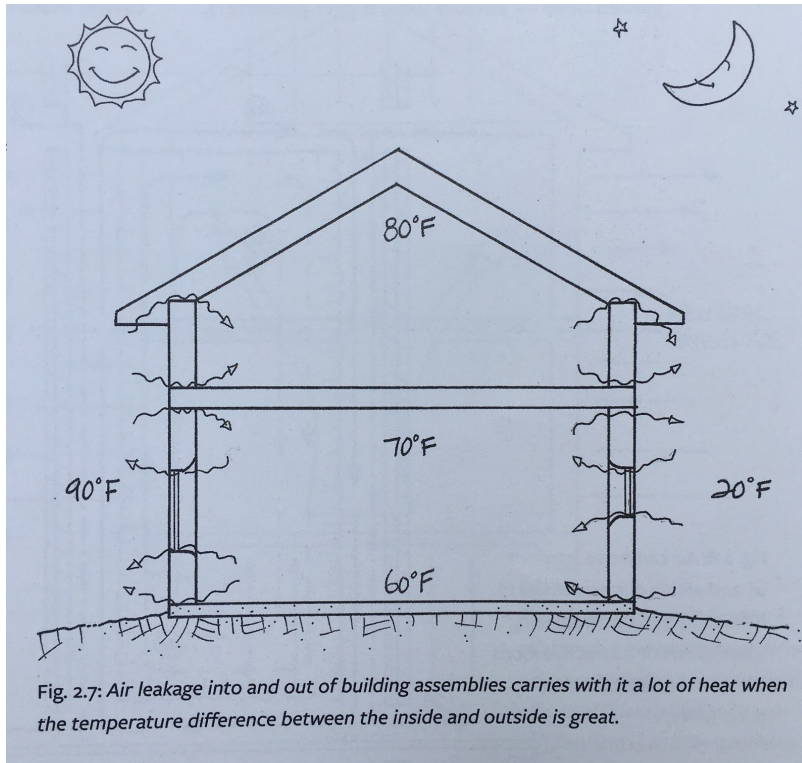
### Sick Building Syndrome – Primary Causes

- Inadequate Ventilation
- Chemical Contamination from Indoor sources
- Chemical Contamination from Outdoor sources
- Biological Contaminants

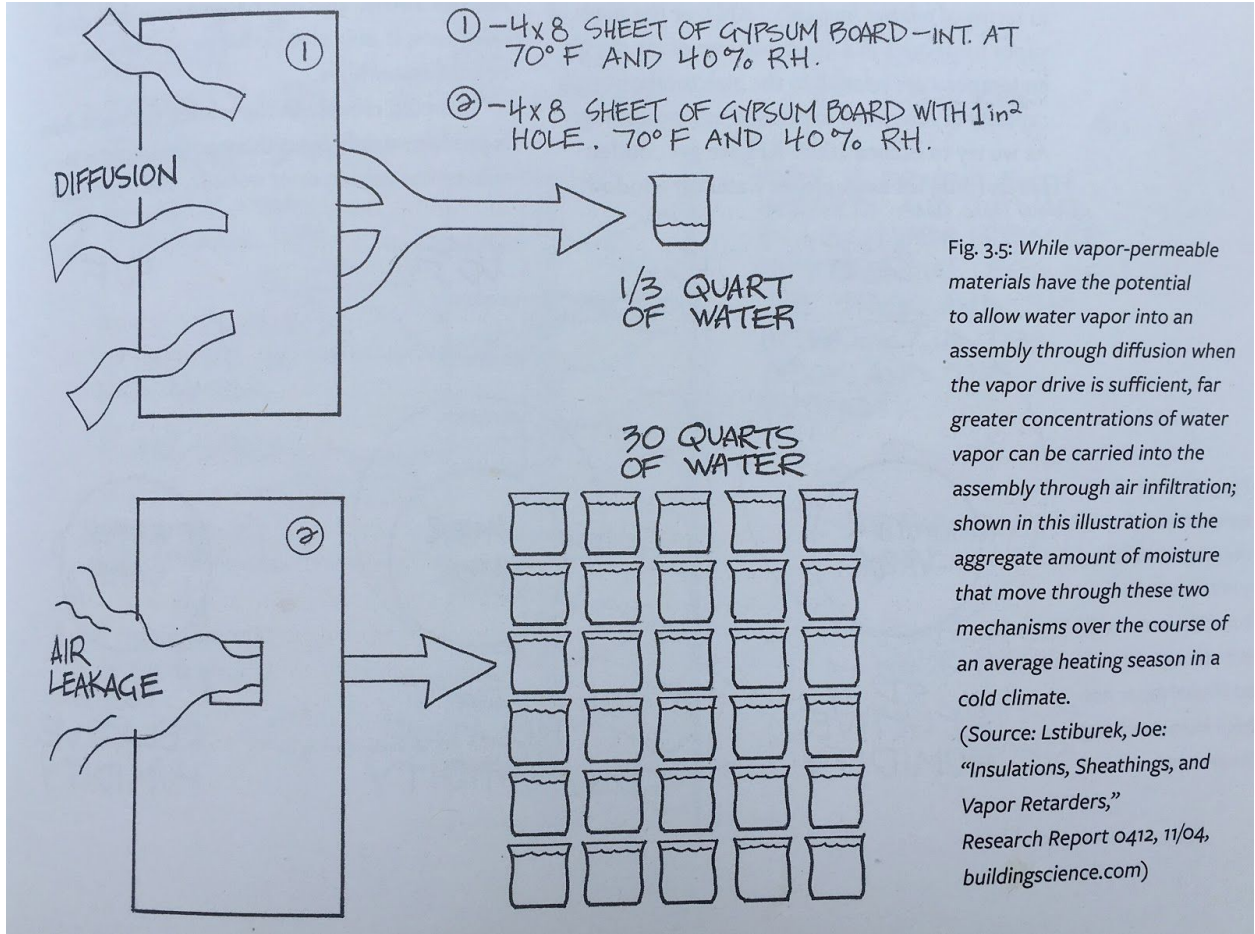


(Image by "Mold Removal Doctor")

Vapor drive is endless. Depending on your climate and the time of year, your home is experiencing vapor drive from the inside out, or the outside in. And to make it even more complicated, the direction of vapor drive can change throughout the year. We also create tons of vapor in our homes just from breathing, cooking, showering, etc.



(Image from [Essential Building Science, Understanding Energy & Moisture in High Performance House Design](#) by Jacob Racusin, Gabriola Island, B.C.: New Society Publishers, 2017.)



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