COMFORT INSTITUTE
Consumer Protection Division

SPECIAL REPORT #9

Excessive Indoor Humidity: *The Secret Cause Of Mold, Allergy Suffering and Discomfort*

How To Protect Your Family's Health And Achieve The Ultimate In Summertime Indoor Comfort

Have you ever awakened in the middle of the night sweating in your air conditioned house? Do you then have to keep lowering the thermostat setting to colder and colder temperatures in order to be comfortable?

Did you buy a new high efficiency air conditioner, but didn't save what you expected to on your electric bills? Or, have you found that the new system doesn't keep you as comfortable as the old one did?

Do any family members suffer from allergies or asthma? Or do you ever smell moldy or musty odors when you come in from outside? Have you noticed mold growing anywhere in your house, for instance on the AC vents?

If you suffer from any of these problems, your home may be afflicted with a widespread, invisible, and until recently poorly understood problem: **excessive indoor humidity**. It is a growing problem, and surprisingly, is being worsened by the use of new higher efficiency air conditioning systems.

Information is the key to knowing how to determine if your home has this problem, and how to solve it, or prevent it when investing in a new cooling system. This report will teach you what you should know **before** talking to contractors, and it will let you in on some little known facts about air conditioning. Unfortunately, even most contractors are not aware of this important new knowledge.

New Air Conditioners Can Contribute To Mold Growth In Homes

The Comfort Institute in Washington is warning that some new high efficiency air conditioners can contribute to unhealthy mold growth in homes.

"The new units do often cut cooling bills by 30% to 50%," says researcher Brendan Reid. "However, there's often a hidden cost to health and comfort. Many new air conditioners simply don't remove the humidity the old ones did. It *is* possible to save energy and remove humidity at the same time, but usually not by simply swapping out the equipment."

Controlling indoor moisture and humidity is the key to controlling mold. The American Lung Association, the American Medical Association, the Environmental Protection Agency, the Centers For Disease Control and many other authorities recommend keeping the relative humidity level in your home between 30% and 50% year round. Higher levels encourage allergy causing dust mites, mold growth and musty odors. High levels of indoor mold can cause serious health problems, including allergic reactions, toxic reactions, asthma episodes, infections and respiratory damage.

There's Much More To Comfort Than Air Temperature

According to Reid, *comfort* also suffers when an air conditioner can't control indoor humidity. "Many people find that they aren't comfortable at various times of the day or cooling season, and don't know why," says Reid. "For example, they might wake up early in the morning covered with sweat. What's happening is their air conditioner is controlling temperature, but the indoor humidity is bouncing up and down, typically from 45% to 75%."

"There's a lot more to being comfortable than just air temperature. When indoor humidity levels are too high, our skin can't evaporate moisture as well." The Comfort Institute has recorded unhealthy relative humidity levels in excess of 80% in some homes with new air conditioning systems.

"Save 50% On Your Utility Bills!" Truth or Fiction?

Many homeowners who have invested in new high efficiency heating and cooling equipment **didn't get the comfort and energy efficiency they paid for**. There are many reasons why. A key one is that many homeowners find they have to change their preferred thermostat settings after putting in a new system.

If faced with a cool but clammy house, many people try to achieve comfort by further lowering the thermostat, so that their air conditioner runs longer. "This can help, but it's no fun to have to be constantly playing with the thermostat to compensate," points out Reid. "Another big problem is that the colder you try to keep the house, the more the air

conditioner has to run compared to when the older unit was doing the job at a higher setting. This eats up a lot of the energy savings that the new unit was supposed to deliver."

A Florida university research study found that every degree homeowners lower their thermostat setting increases air conditioner use by 10%. Colder settings also lead to increased surface condensation and mold growth.

Tips To Controlling Indoor Humidity

The Comfort Institute offers the following tips to ensure your new air conditioning system can control indoor humidity, keep mold at bay, and save money on utility bills:

Ensure your system is the right size. "When it comes to air conditioning," says Reid, "bigger is not better. An oversized unit will quickly cool the house and then shut off before it does the longer job of removing humidity." The Comfort Institute, as well as the Department of Energy, US EPA, and electrical utilities nationwide, recommends having your contractor perform a computerized equipment sizing calculation conforming to the industry standard "Manual J".

Consider an air conditioner with enhanced dehumidification features. Not all systems are the same in regards to moisture removal. Ask for a unit with a *TXV valve*, and be sure the contractor doesn't intentionally pick an excessively large indoor evaporator coil just to claim a higher SEER rating. "Some units have advanced humidity sensing controls, variable speed fans or two speed compressors that help wring out more moisture," explains Reid. "Unfortunately, the air in these systems runs much colder, which can lead to excessive "sweating" on ducts and equipment located in attics or crawlspaces."

Consider investing in a high capacity ducted dehumidifier. Even the best AC unit can't keep the house dry and comfortable during cloudy or rainy weather. There are now high efficiency, high capacity dehumidifiers available that supplement the air conditioning system. They can be installed out of sight using ductwork, and connected to a condensate drain so that you never have to empty the reservoir. This equipment dehumidifies the whole house and also cleans the air 24 hours a day, 365 days a year. Some models even provide filtered fresh outdoor ventilation air.

Install and use quiet, effective bathroom exhaust fans when bathing. Exhaust the steam before it humidifies the rest of the house.

Install high efficiency air filters and regularly clean the indoor coil and drain pan. Having a contractor perform this service is essential to control mold growth in the duct system.

Have your house and duct system tested for excessive air leaks, and have them sealed. "In much of the country, for most of the spring, summer and fall, the primary source of moisture is the outdoor air leaking into the house. It contains very high levels of humidity in the form of invisible water vapor," explains Reid. "While some outside air is necessary, too much raises summertime indoor humidity to unhealthy levels, and can overcome the dehumidification capacity of the air conditioner. The worst air leaks are usually in the heating and cooling duct system. The new AC systems are much more affected by duct leaks than the old equipment."

The Comfort Institute recommends having your home tested using a new computerized diagnostic instrument that measures air leakage. "The Infiltrometer blower door test typically takes an hour to perform," says Reid.

"The result is an exact measurement of the home and duct system air-tightness. Some houses are very air tight and clearly need improved ventilation. On the other hand, most are too leaky. This usually causes excessive summer humidity, dry air and cold drafts in winter, uncomfortable rooms, excessive dust, and high heating and cooling bills. Until you test, you just don't know."

The Infiltrometer test instrument was originally invented by Department of Energy scientists. It has been featured in National Geographic magazine, Popular Science, and on This Old House and other TV shows. Many heating and air conditioning contractors offer the test as part of a ***"Whole House Health and Comfort Checkup"*** that also checks insulation levels and overall duct system performance.

Are You Breathing Good Air Or Bad?

Some air leaks can also bring in contaminated air. "Many air leaks in houses don't actually let in fresh air," says Reid. Building scientists have recently discovered that in the typical home, well over half the incoming air first passes through the attached garage, crawlspace, basement or attic. Air pollutants such as mold spores, crawlspace moisture, insulation fibers, carbon monoxide, automobile exhaust, radon gas or volatile organic chemicals can contaminate this incoming air, and negatively affect your family's health and safety.

"The Infiltrometer test pinpoints where the bad air leaks are, and provides guidance on how to fix them," says Reid. "Many can be easily repaired by homeowners as weekend projects. Others such as duct leaks are better left to professionals. Finding and fixing the leaks that let in bad air will make your home healthier, less humid in the summer, less dusty, more comfortable, and even pay for itself through lower heating, cooling and repair bills."

The Comfort Institute recommends the Infiltrometer testing and consulting service to homeowners who are considering a new air conditioner, or have hot and cold spots, excessive dust, allergy suffering, or high utility bills.

"Controlling indoor humidity is just as important as controlling air temperature," says Reid. "In the summer, a dry house is a comfortable, efficient and healthy house. A sealed duct system, a reasonably tight house, and a properly sized, engineered and installed air conditioner are the first steps. For homeowners wanting the healthiest and most comfortable home possible, a high efficiency central dehumidifier is the next crucial element."