



INDOOR AIR QUALITY



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Optimizing indoor air quality can be achieved when conditions that promote mold and mildew growth are avoided while maintaining human comfort. The list below identifies conditions that must exist at the same time for mold growth to occur.

1. Temperatures in the 70°F - 78°F range.
2. Humidity levels above 60% relative humidity.
3. Food source, i.e. – building materials like wood, adhesives, paper, etc.

Since human comfort and mold growth occur within the same temperature range, and humans build with materials that mold like to eat, we must be vigilant at controlling indoor humidity levels below 55% relative humidity. Sounds easy? It's not. Sounds like it is the air conditioning designer's sole responsibility? It's not: it takes a team of architects, contractors, engineers, owners and their staff to successfully control humidity.

Following the guidelines below is the foundation for achieving good indoor air quality.

BUILDING ENVELOPE

Have a good building envelope designed by an architect and installed by a contractor familiar with the harsh south Florida climate.

Dry the structure

1. All construction materials should be properly dried and prepared for finishes.
2. All finishes should be allowed to dry properly prior to owners moving in.

Seal the envelope

1. Seal all windows, doors, pipes, electrical boxes, etc. that penetrate the building's exterior.
2. Weatherstrip doors and windows.
3. Seal the attics.

Prepare for moisture penetration

1. Design and install a breathable wall system. It is inevitable that even the

highest quality construction, installation, and products will have many minor imperfections that will allow moisture to get into the walls. This moisture, especially from a rain-wetted wall with the sun shining on it, will migrate through the wall. Moisture always moves from high humidity levels (usually the Florida outdoors) to low humidity levels (usually the indoors). The air conditioning system will remove this moisture.

2. Avoid wall and floor coverings that don't breathe, such as vinyl. If moisture migrates towards the inside of the building, it will get trapped if the wall coverings don't breathe. When trapped, mold and mildew will have the three conditions available to promote its growth; food, temperature and moisture.

AIR CONDITIONING

Have an air conditioning system designed by an engineer and installed by a contractor familiar with the intricacies of the south Florida climate.

Design of A/C system

1. **Zone** – Dividing the buildings into relatively small zones, each with its own thermostat helps with temperature control.
2. **Sizing the air conditioning system** - A/C units that are properly sized run long enough to effectively remove moisture.
3. **Equipment selection** - Selecting equipment with leaving coil temperatures no greater than 55°F will effectively remove moisture.
4. **2-stage equipment** – Select mostly 2-stage equipment. A/C units run most of the time in the 1st stage (removing moisture) and the 2nd stage is for when large heat gains occur, like as on summer afternoons, while cooking, during a party, etc.

5. **Dehumidification** – Select most A/C units with hot gas reheat which dehumidifies when indoor relative humidity levels are above the setting on the humidistat.

Kitchen Hood

1. A dehumidifier is installed to provide dehumidification to outside make-up air when the kitchen hood is exhausting air.
2. The make-up air for the kitchen hood also reduces the effects of negative pressures from exhausting air through the kitchen hood. This, in turn, reduces warm, humid air infiltration from the outside.

Building Pressurization

1. Slight positive pressurization of the building is achieved by bringing in outside air directly ducted to the A/C unit. The outside air is dehumidified and cooled before it is introduced to the living spaces.

Filtration

1. **Pre-filter** – A pre-filter traps some of the large sized dust and particles in the air. Particles that pass through this filter sometimes stick to the inside of the A/C unit where it can become a breeding ground for mold and mildew. Routine and frequent cleaning is highly recommended.
2. **Final Filter** – The final filter is located on top of the A/C unit. There, it traps smaller particles, those that pass through the pre-filter, and those that are inside the A/C unit before it delivers clean, conditioned air to the rooms.
3. **UV lights** – UV lights are sometimes installed inside the A/C cabinets to kill live mold and mildew. The final filter traps the dead particles. The lights fail frequently and are often removed permanently because of high maintenance.

HABITS OF THOSE WITH GOOD INDOOR AIR QUALITY

Exceptional building performance and indoor air quality is not only a product of good design and installation by the designers and contractors, it is also a product of a myriad of owners' and their staff's contributions.

A/C Settings

1. **Temperature** – Temperature range between 72°F and 78°F promote optimal indoor air quality. Temperatures lower than 72°F can cause moisture on interior surfaces. Temperatures higher than 78°F will reduce the amount of time the A/C units run, thus could result in elevated indoor relative humidity levels.
2. **Relative Humidity** – Relative humidity levels range between 40% and 55%. Humidity levels lower than 40% could cause conditions that are too dry for human comfort and may damage finishes. Humidity levels

above 55% could encourage mold and mildew.

3. **Fan Operation** - Fans in the A/C units should be set in the AUTO position so they cycle on and off as the A/C unit cycles. (Running A/C unit fans in the ON position has been known to elevate indoor relative humidity levels.)
4. **Exhaust Fan Operation** – Turn off exhaust fans when done using them. Leaving them on will cause infiltration of outside air and elevate indoor relative humidity levels.

Building Envelope

1. Keep the indoor environment controlled. Opening the doors and windows will let outside air into the building and may cause undesirable conditions to the indoor environment.

Maintenance and Cleaning

1. Develop a regular maintenance program for A/C equipment. Pay particular attention to changing filters, cleaning the inside of the A/C unit and drain pan, clearing the condensate lines, etc.
2. Develop a regular maintenance program for the building envelope for re-caulking of doors and windows, repair of cracks in stucco, etc.
3. Be sure to set and monitor indoor temperatures and relative humidity levels and alarms.
4. Develop a cleaning regiment using products not objectionable to the owners and occupants.
5. Keep the bathrooms clean and dry, especially the shower walls and floors where mold and mildew are most likely to grow.